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An Address.[1]

By E. H. MOLESWORTH, M.D. (Sydney), F.R.A.C.P.,
Member of the New South Wales Medical Board.

THE President has asked me this year to take his place and to deliver the address to recent graduates, an honour which I appreciate highly. We, as senior members of the profession you have chosen and of the body to which the Government of this State has entrusted the control of medical practitioners within its boundaries, now most heartily welcome you into the fold. In so doing, however, we wish to point out that the Medical Board is not only empowered to admit persons to the register, but is also invested with disciplinary functions. Hitherto those disciplinary powers have been limited to permanent deregistration. But under the new *Medical Act*, which will shortly come into force, the board is given power to reprimand a registered practitioner, to suspend him for a period of not more than a year, or to deregister him permanently. It may be taken as certain that the board will exercise these new powers without fear or favour, and that some of the less serious offences which might conceivably have escaped punishment under the old act will not escape the humiliation of a public reprimand or a temporary suspension under the new régime. The privileges afforded to the registered medical practitioner are: first and foremost, membership of an honoured profession; secondly, the right to give death certificates, to appear as expert witnesses in medical matters in the courts of law, to act as medical officers in public hospitals, the Government service, the army and navy,

[1] Delivered to recent graduates (1939) on their registration.

to sue for fees duly earned, to prescribe and to administer certain dangerous drugs as required by the exigencies of the case, to perform operations which entail a risk to the patient's life, and even, under certain strictly prescribed conditions, to do a thing such as perform an operation for the termination of a pregnancy, which otherwise would be a criminal or a capital offence. These conditions are that after consultation with one or more colleagues qualified to express a sound opinion upon the emergency, those brought into consultation agree that the procedure is necessary to save the mother's life.

Medicine recognizes all religions and no religion. Catholic and Protestant, Christian and infidel, Jew and Gentile, are all one in medicine. The religion of his colleague or of his patient is no business at all of any medical practitioner. But the standard of ethics which should guide the conduct of the medical practitioner is the business of everyone, whether he be a doctor or a member of the lay public. I am not referring to those matters of etiquette which the less enlightened section of the community generally confuse with the ethics of the medical profession. These matters of etiquette, though important in many respects, are mainly matters of good manners toward one's colleagues, the amenities of collaboration between medical men. The ethics of medical practice, however, are founded upon the interests of the patient and of the public.

Medicine, as you know, has traditions far more ancient than those of any surviving religion, and almost coeval with those of the priesthood of any religion. In primitive civilizations the priests were doctors not only of the soul, but of the body. But the first formulation of medical ethics came from a physician who was not a priest. Passing by the mythical Imhotep and Æsculapius, we come to the historical Hippocrates, who lived in the fifth century before Christ, and who was not only a highly skilled physician according to the standards of his time, but also was a man of the highest ideals. I shall not weary you by repeating the famous Hippocratic oath, with which no doubt you are all familiar. But I will remind you that it is upon this oath that modern medical ethics are founded. The doctrine of inviolability of confidences made by the patient to his medical attendant came from Hippocrates, and is as strict as that governing the priest with respect to the confessions of a penitent. The medical practitioner must always put the interests of his patient before his own financial interests or the interests of others. He must never use his special medical knowledge to bring about the illness or death of any person on any pretext, personal, religious, political, social or otherwise. All these doctrines come from Hippocrates. On the subject of inviolability of knowledge gained from or of the patient by the medical attendant, it is to be stated that not even a husband or a wife is necessarily entitled to know what the patient has told the doctor, or in certain cases what the other is suffering from, unless the patient has consented to the disclosure being made. For example, a medical attendant has no right, without the express permission of the patient, to disclose to a husband or wife that the other party has contracted a venereal disease. There is a very strong body of medical opinion that the medical attendant should refuse, even in the face of a command from the presiding judge, to disclose such knowledge in a court of law, especially, for example, in a divorce court. Laws are largely framed by lawyers, and it is significant that lawyers alone by law are exempted from divulging their clients' secrets in a court of law. Even in lesser matters, where no harm is foreseen, the disclosure of the patient's condition may be embarrassing or humiliating to the latter. Moreover, inquiries on this subject are often made only out of idle curiosity or for the purpose of gossip. Such inquisition is easily frustrated by your pointing out that you are bound not to discuss the patient's affairs with others, no matter how much those others may consider themselves entitled to the information.

Again, a medical attendant is precluded from performing unnecessary operations or from carrying out unnecessary treatment, from running up an unnecessary number of visits, from charging unduly high fees, from advertising, from employing touts, from paying commissions, from employing (or as it is called "covering") an unqualified person in the performance of medical work, from using a public hospital appointment as a means of recruiting patients from his hospital to his private practice. All these things imply some damage to the patient's interests, medical or financial, and most of them come under the definition of infamous conduct in a professional sense.

Nor is it in the best interests of the public that a medical man should patent any drug or means of treatment, or that he should fail to notify the medical world of any useful discovery he has made in diagnosis or treatment. In short, any knowledge gained by any medical man is the common property of the medical profession and of the public. It is the trick of the charlatan, whether he be a quack or a registered medical practitioner, to refuse such information or to conceal any such knowledge. It is equally the act of a charlatan or a quack to pretend that he possesses such secret or exclusive knowledge for the purpose of impressing the public or attracting patients.

To revert to the question of covering. This means collaboration with an unqualified person in the practice of medicine and the covering or concealing of the latter's actions and mistakes which cause injury to the patient, or which are against the public interest. For example, if a qualified medical man acts on behalf of an unqualified practitioner, or an advertising institute, to cover and conceal from the patient the damage done by the unqualified practitioner to the patient, he appears to me undoubtedly to be guilty of covering. This does not mean that

the medical practitioner should not, as a matter of course, do his utmost to repair such damage.

In addition to all this, the registered medical man who is careless or reckless in the treatment of his patient is open to an action for damages in law. For example, failure to have a radiograph taken in the case of fracture, or to obtain the help of a more experienced or specialized colleague in consultation might easily render the practitioner in question liable to civil damages amounting to £5,000 or more. It is well, therefore, not to be over-confident of one's ability or to neglect precautionary measures. It is a sound maxim never to refrain from asking for a consultation for fear of losing face with the patient or his family, and never to refuse a consultation requested by the patient or his family. It is perfectly open to you to suggest that some other consultant is better qualified to provide help in this particular case than the man they propose. But if they insist, it is wiser to meet their nominee, provided he is a reputable and registered practitioner.

If on any of these matters you have doubts as to what is your right course in any given circumstances, remember that there are any number of senior members of your profession who will always be ready to give you all the help they can provide from their riper experience.

The medical profession provides gratuitously public service of a kind and in an amount never dreamed of in any other vocation, perhaps with the exception of the clerical profession. When one considers the magnitude and the value to the State of the gratuitous medical service provided, not only in public hospitals but in private practice, by the medical profession, it is hard to understand why so many of the public and so many politicians are so suspicious or so critical of medical men as a body. It is not because we are a close preserve like plumbers or electricians, who alone are permitted to rectify any little fault in the householder's property. Though registration is denied him, any person, no matter how devoid of knowledge or qualification, is permitted to treat the sick, even for dangerous and fatal diseases. No! it is because, in the very interests of the public, we do not publish our successes in the Press or over the air; it is because the public takes as a right the gratuitous services which our profession is proud to provide, because they take successful work as a matter of course, because the attention of the public is turned only to our failures, real or supposed, and, last, but not least, because some of our members are recreant to the ideals and ethics of our profession. Having had experience of some few such offences implying exploitation of the public by a small minority of unscrupulous practitioners, some of the public and some politicians make the age-old error of generalizing from the particular and put all or most medical practitioners into the category of the few renegades.

If any medical practitioner exploits his patient or the public for his private interest or gain, he may expect much more severe criticism and punishment from his own colleagues than he would suffer if the same acts were committed in another vocation.

But since you have been trained for six years not only in the science and art of medicine, but also in the atmosphere of its ethics, we have no doubt but that you will follow in its best traditions. You have to make a living from your profession, but if any of you propose to commercialize your knowledge of medicine you are likely to get into trouble. Unlike commerce, medicine offers few opportunities for making a fortune. The few medical men who have become rich have nearly all done so by shrewd and successful investments. But even if you do not become rich, you will have, if you are truly interested in and in love with medicine, a full and absorbing life. You will have the satisfaction of having done good work and of having justified your existence by performing service for your fellow men.

Quite briefly, and mainly as an expression of my personal beliefs, I wish to state that I am in accord with Professor Robertson, of the Mayo Clinic, when he expresses regret and fear of damage to the public interest as a result of the tendency shown by some modern governments to regiment medical practitioners into the ranks of civil servants. Medicine today is made up much more of science than of art. But art still remains as an important factor. In any case, however, both science and art must be free if they are to be healthy and progressive. History has provided abundant proof that under domination, whether religious or political, both science and art wilt and fade. First they lose initiative, then they cease to experiment, and adventure into the unknown ceases. They finally become stereotyped, purely formal and entirely enslaved to the authority of the past. As examples of this one has only to remember that in the later stages of Egyptian civilization it was forbidden to portray the human form except in a strictly defined conventional profile, and to recall the slavish subjection of the Middle Ages to the philosophy and science of Aristotle. It took the martyrdom of a Bruno, the courage of a Galileo, the diplomacy of a Bacon, the sublime detachment of a Newton to break the bonds with which Church and State had fettered science. Initiative and the spirit of adventure provide the very breath in the nostrils of science. Yet both these qualities are always discouraged in the civil service of all times and are hobbled with red tape or smothered in a snow-storm of official files, certificates and forms.

One of the influences which attract young men of ability and energy into the medical profession is the promise of independence of thought and action, freedom from domination by a superior officer, and the hope of discovering something new. If this attraction is withdrawn from those who are trying to decide upon a career, it is almost certain that the quality of applicants for admission to our medical schools will fall off to a serious degree.

And if, as seems inevitable, initiative and adventure are hampered, progress will slow down until nothing new is attempted. Such results will be disastrous not only to medicine, but to the public interest. Moreover, the relation between doctor and patient, as we know it today, is far too intimate and too complicated to be transformed into the relation between a sick man, woman or child, and a medical civil servant, who is forced upon the patient by a too paternal government. And when one considers the logical conclusion of such measures, and that the medical civil servant will have to be granted the privilege of an eight-hour day, of working in shifts, and of overtime, each of which will have to be paid for in full, it seems certain that the public will have to pay more dearly for a service of a quality much inferior to that provided by a free and independent medical profession today.

The employment in hospitals of whole-time medical officers, except as residents, has, after a long trial, been abandoned recently in New South Wales (Prince Henry Hospital). It is therefore curious to find the Queensland Government instituting the measure. Some hospitals in Queensland are staffed by permanent officers. In others honorary medical officers are replaced by paid visiting officers. Provided the system of visiting medical officers is retained, perhaps the payment of the staff will not matter so much. But it may be prophesied with confidence that the permanent medical officer who has to be a jack of all trades will soon deteriorate, and the service to the public will suffer.

One wonders why the medical profession should be singled out for nationalization, when already, by the free will of its members, it provides so large a volume of gratuitous public service. It might be suggested that other professions and avocations should first provide equivalent service before the medical profession is asked to give up its independence. Why should not lawyers and accountants provide free advice to indigent persons? Why should not plumbers and electricians do the same? The medical profession has provided such services for centuries, and the practice has improved the quality of the service made available for all sections of the community. Why not apply the lesson thus learned by requiring members of other occupations to do likewise rather than risk nullifying all the gains made by diverting medical service from free into confined channels?

I wish to make it quite clear that I have no desire to decry the service provided in preventive medicine by government medical officers. Far from it; but at present that body of men is recruited from a free medical profession and has to stand up to comparison and to criticism by colleagues outside the civil service. But I hesitate to express my fears as to what may happen if all medical men are bound by the regulations applying to civil servants, and if independent action, initiative, criticism and competition are removed from the government medical services.

I feel confident, however, that in so far as the medical profession can control developments, the guiding force will always be consideration of the interests of the sick in the present and in the future. We are sure that you, the newest members, will all follow that ideal in preference to consideration of your own profit and comfort.

I have only one final word of advice to you, namely, that when you come to decide upon the particular branch of medicine which you intend to follow, you will choose that in which you are more interested, rather than that in which you think you might make more money. I am a firm believer in the idea that no one does a job well unless he is interested in it.

On behalf of the Medical Board I wish you all success, happiness and honourable advancement in this your chosen profession of medicine, which we all love so well.

AN INVESTIGATION OF THE PATTERSON TEST FOR THE CHEMICAL DIAGNOSIS OF PREGNANCY.[1]

By Vera I. Krieger, D.Sc.,

From the Biochemistry Department, University of Melbourne, and the Women's Hospital, Melbourne.

Patterson[1] has recently described a colorimetric test for the detection of œstriol (theelin) in the urine as a means of diagnosing the existence of pregnancy. The method is based on the liberation of œstriol by bacterial hydrolysis of the œstriol glycuronide, its subsequent extraction in ether, removal of the urinary pigments and finally treatment with a phenol sulphonic acid reagent leading to the development of a pink or red colour.

Technique of the Patterson Test.

The Patterson test is carried out in the following way:

Fifty cubic centimetres of concentrated early morning urine just alkaline to methyl red are heavily inoculated with *Bacillus coli* and incubated overnight. While the urine is still warm 0·5 gramme of sodium bisulphite is added, dissolved by being shaken and allowed to stand for fifteen minutes. The urine is extracted twice with 40 cubic centimetre volumes of ether. The combined ether extracts are washed with water and then shaken with 30 cubic centimetre portions of 10% sodium carbonate until the carbonate layer is quite colourless. The ethereal solution is again washed with distilled water. The ether layer is extracted with two 30 cubic centimetre volumes of N/10 sodium hydroxide. The combined alkali solutions are acidified to Congo red with a 25% solution of sulphuric acid and then extracted with two forty cubic centimetre volumes of ether. These combined ether extracts are washed with distilled water, with 10% sodium carbonate, and finally with two volumes of distilled water. The final

[1] In a previous article, published in the issue of March 25, 1939, Dr. Krieger described the results of an investigation into the Visscher-Bowman test for pregnancy.

clear, colourless ether solution is transferred in two portions to a 50 cubic centimetre flask and the ether is removed by distillation in a water bath at 70° C. The final traces of moisture are removed by application of direct suction to the flask. The dry residue is heated for ten minutes in a boiling water bath with one cubic centimetre of phenol-sulphonic reagent (nine cubic centimetres of pure carbolic acid and 14 cubic centimetres of concentrated sulphuric acid). The mixture is cooled under the tap, treated with one cubic centimetre of a 5% solution of sulphuric acid, and is then reheated in a boiling water bath for two and a half minutes. A positive reaction is indicated by a pink or red colour, and in the absence of this change the reading is negative.

Patterson tested 65 specimens of urine, including 42 from patients in the early stages of pregnancy, as proved by clinical data or the Friedman test, and 23 specimens from non-pregnant women. In the pregnant group there were one negative response and two doubtfully positive reactions. No positive reactions were obtained in the non-pregnant group.

Results of the Patterson Test Applied to a Series of Samples of Urine.

Two hundred and twenty-five specimens of urine from pregnant and non-pregnant women have been submitted to the Patterson test, and the results are summarized in Tables I and II. As would be expected, the strongest reactions were obtained in greatest numbers amongst those patients whose pregnancy was of longest duration. In early pregnancy 50% of tests gave a reaction, but not a very strong reaction.

In ten cases in the pregnant group negative results were obtained, and nine of these occurred in specimens of urine from women with pregnancy of not more than twelve weeks' duration. Doubtful results were obtained in a further five instances, and four of these were also in the early pregnancy group.

Tests on 64 specimens of urine from non-pregnant women all gave negative results. This group included seven cases of possible pregnancy.

In two cases it was doubtful whether the patient was pregnant or was suffering from a hydatid mole; the result of the Patterson test was a strongly positive reaction in one case, in which pregnancy was later proved to be present, and was negative in the second, in which a hydatid mole was present.

In six instances of suspected early pregnancy the Patterson and Aschheim-Zondek tests were correlated. The results of the two tests agreed in all cases, being positive in four and negative in the remaining two.

Table II.

A Comparison of the Results of the Patterson Test in Early and Late Pregnancy and in Young and Old Non-pregnant Women.

Result of Patterson Test.	Pregnant Women.		Non-pregnant Women.	
	Pregnancy up to 16 Weeks.	Pregnancy 17 Weeks to Term.	Over 45 Years.	Under 45 Years.
Negative ..	9	1	50	14
? Positive ..	4	1	—	—
Positive (slight) ..	54	7	—	—
Positive (marked)	24	3	—	—
Positive (very marked) ..	15	43	—	—
Total (225) ..	106	55	50	14

In two instances in which the Patterson test gave a doubtful result, specimens taken a day later gave positive reactions.

In an attempt to decrease the number of doubtful reactions and to obtain stronger reactions in those cases in which slightly positive results were obtained, larger volumes of urine were treated by the Patterson technique. Large volumes of urine were also submitted to continuous ether extraction,

Table I.

Comparison of Positive and Negative Responses to the Patterson Test at Different Stages of Pregnancy.

Result of Patterson Test.	Length of Pregnancy in Weeks.																						
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28 and over.
Negative	—	1	2	2	2	—	—	—	1	—	1	—	—	—	—	—	—	1	—	—	—	—	—
? Positive	—	—	2	1	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—
Positive (slight)	1	2	11	3	7	3	20	1	1	2	3	2	1	—	—	—	—	—	2	—	—	—	2
Positive (marked)	1	3	6	1	2	—	7	2	1	1	—	—	1	—	—	—	—	—	—	—	—	—	2
Positive (very marked reaction)	—	—	3	—	1	1	7	—	2	1	—	—	1	3	—	1	1	1	1	—	—	—	35
Total tests: 161	2	6	24	7	12	4	34	3	5	4	5	2	4	3	—	1	1	2	3	—	—	—	39

the ether solutions then being washed and extracted as in the Patterson method. In both instances the final pink reaction was masked by a brown colour, presumably due to the presence of organic material extracted with the theelin.

Modification of Patterson Test.

In the method developed by Butenandt[2] for extraction of theelol and theelin from urine, crude extracts were dissolved in a 50% solution of methyl alcohol, and benzoic acid and cholesterol were removed by extraction with petroleum ether. One hundred and fifty cubic centimetres of urine, after treatment with *Bacillus coli* and then with sodium bisulphite, were therefore extracted twice with ether, the combined ether extracts were washed free from urinary pigments with 10% sodium carbonate and finally washed with distilled water. The ether was then removed by distillation and the residue, after being dissolved in 50% alcohol, was extracted with petroleum ether. The alcohol portion was then extracted twice with ether. The combined ether solutions were extracted with N/10 sodium hydroxide and the method of Patterson was applied from this stage.

Thirty-nine specimens of urine from early pregnant women and 27 from non-pregnant women were examined by this modified Patterson technique, and the results for the pregnant group are tabulated in Table III. In 19 of the 39 specimens strongly positive reactions were obtained, whereas only 12 out of 89 (Table I) gave marked reactions with the Patterson method. There were five negative results and one "queried positive" in this series, so that there was no improvement in the detection of pregnancy by the use of larger volumes of urine.

Table III.

Modified Patterson Test in which 150 Cubic Centimetres of Urine were Used.

Result of Modified Patterson Test.	Length of Pregnancy in Weeks.							Total Tests.
	6	7	8	9	10	11	12	
Negative	—	1	1	—	—	—	3	5
? Positive	—	—	1	—	—	—	—	1
Positive (slight)	—	—	3	—	—	—	2	5
Positive (marked)	—	—	2	—	3	—	4	9
Positive (very marked)	1	1	3	—	5	—	9	19
Total tests	1	2	10	—	8	—	18	39

The failure to obtain positive results in urine from non-pregnant women was in agreement with the results obtained in a similar group of specimens tested by the Patterson method.

Discussion.

As Patterson has pointed out, this test is rather tedious because of the number of steps involved in the extraction of the œstriol from urinary pigments and other interfering substances, which obscure the colour reaction.

When only chemically pure reagents were used and care was taken to remove all urinary pigment, some reactions were masked by a brownish colour, probably owing to the inclusion of organic material in the final residue. Only when a mauve colour was apparent were such reactions recorded as positive.

By extraction of an alcohol solution containing the theelin from 150 cubic centimetres of urine with petroleum ether to remove cholesterol and benzoic acid, and then after treatment of the alcohol solution by the Patterson method, fewer obscure reactions and a greatly increased number of very marked reactions were obtained. This treatment, however, did not decrease the number of negative results from patients known to be in the early stages of pregnancy.

Among women who were proved by clinical data or subsequent examination to be in the early stages of pregnancy, 12% of tests gave doubtful or negative results. In Patterson's series and in the two series reported in this paper no positive result has been obtained from urine from non-pregnant women.

If the Patterson test gives a positive reaction it therefore seems safe to assume that pregnancy exists. Pregnancy may be present in some instances when negative results are obtained.

Patterson has indicated that the chief advantages of the test lie in the fact that the results can be obtained in twenty-four hours and that urine which has undergone putrefaction is quite satisfactory. Also a chemical test is useful when animals suitable for the biological method are not available.

Conclusion.

The Patterson test is the most satisfactory chemical test so far advanced for the detection of early pregnancy.

Acknowledgements.

I am greatly indebted to Sister Couper, of the Women's Hospital, for her cooperation in obtaining specimens for the tests, and to Dr. Rome for his courtesy in checking data establishing the length of pregnancy.

References.

(1) Jocelyn Patterson: "The Chemical Diagnosis of Early Pregnancy: A Method Based on the Detection of Œstriol in the Urine", *The British Medical Journal*, September 11, 1937, page 522.

(2) A. Butenandt: Quoted in "The Chemistry of the Hormones", by Harrow and Sherwin, page 174.

"CARDIAZOL" CONVULSION THERAPY IN THE PSYCHOSES.

By W. S. Dawson, M.D. (Oxon),
Professor of Psychiatry, University of Sydney.

Since the introduction of "Cardiazol" convulsion therapy by L. von Meduna in 1936 the method has been adopted widely, and by reason of its comparative ease of administration and safety is favoured by many in preference to the insulin shock therapy devised by Sakel.[1] Both methods were primarily and are still to a large extent applied to so-called schizophrenia. In his earlier published results von Meduna claimed a remission of from 80% to 90% in cases in which "Cardiazol" convulsion therapy was used within six months of the first manifestations of psychosis, while Sakel estimated a slightly lower percentage of remissions after insulin shock therapy. More recently Sakel has reported as follows on cases of schizophrenia treated in the mental hospitals of New York State:

Of 1,356 patients who received insulin shock therapy, 14·2% recovered, the condition of 20·6% was much improved, 26·3% improved, and 38·9% failed to respond.

Of 1,039 patients admitted to hospital for the first time, but not treated, 3·5% recovered, the condition of 11·2% was much improved, 7·4% improved.

Of 523 patients who received "Cardiazol" convulsion therapy, 4·4 recovered, the condition of 9·8% was much improved, 32·1% improved.

We thus have 61% of patients showing varying degrees of improvement under insulin shock therapy as against 46% under "Cardiazol" convulsion therapy; but amongst 192 patients whose condition was of under six months' duration, 19% were unimproved under insulin shock therapy as against 11% under "Cardiazol" convulsion therapy. In two series of cases of between six and twelve months' duration, the unimproved patients were 28% and 25% respectively. It may be noted that Sakel's results with his own method appear to be decidedly more favourable than with "Cardiazol" convulsion therapy.

As so often happens with new treatments, it seems likely that earlier reports of the results of "Cardiazol" convulsion therapy were unduly optimistic. Few workers have been able to satisfy von Meduna's estimate of "80% to 90% probability of remissions in cases treated within six months of the first manifestation of the disease".

According to figures published recently by Messrs. Knoll, the manufacturers of "Cardiazol", amongst 2,326 patients with schizophrenia treated in various European clinics there were 675 (29%) remissions, whilst among 763 patients with a duration of illness up to eighteen months there were 398 (52·2%) remissions. Amongst 1,751 patients treated outside Europe there were 397 (22·7%) remissions and 617 (35·2%) improved, and amongst 480 patients the duration of whose illness was twelve months or less, there were 244 (50·8%) remissions and 98 (20·4%) improved.

Description of the Method.

For the benefit of those who may not have access to recent literature describing the technique of the procedure, the following is the method employed in the Department of Psychiatry, Royal Prince Alfred Hospital.

A 10% aqueous solution of "Cardiazol" is "buffered" to pH 8·0 by the addition of di-sodium hydrogen phosphate, whereby there is said to be less tendency to thrombosis and fibrosis of injected veins. In private practice the ampoules of solution prepared by Messrs. Knoll are convenient for use. The injection should be given after several hours' fast. The amount of the first injection should be 5·0 cubic centimetres of a 10% solution; if this fails to produce a convulsion, another 6·0 cubic centimetres should be given immediately. Should this additional amount also fail, another attempt should be made next day with 7·0 cubic centimetres, with an additional 8·0 cubic centimetres if necessary; and on the following day with 9·0 and a further 10·0 cubic centimetres should no convulsion be produced. With the patients treated here it has not been necessary to exceed a single dose of 13·5 cubic centimetres. Von Meduna reports that in one case he failed to produce a convulsion until the fourth day, when he had to give 11·0 cubic centimetres, followed immediately by another 12·0 cubic centimetres. He states that he has seen no harm result from 16 + 16 + 14 cubic centimetres, a total of 46·0 cubic centimetres (or 4·6 grammes of "Cardiazol") given in three successive minutes. A successful intravenous injection, which must be given as quickly as the piston of the syringe can conveniently be propelled, is followed within from ten to thirty seconds by a cough, when a tampon should be inserted between the jaws; aimless or perhaps defensive movements of the arms occur, and there is a general stiffening, in which the patient usually assumes the posture of extensor rigidity. This phase lasts from ten to twenty-five seconds, after which the mouth is opened (the tampon is adjusted or inserted) and clonus develops; clonus lasts for from thirty to forty-five seconds and is followed by coma lasting from five to ten minutes. Dislocation of the jaw or the shoulder may occur during the convulsion, so that violent movements should be restrained as far as possible. A dose which fails to produce a convulsion may yet give rise to a most unpleasant feeling, sometimes amounting to terror, lasting several seconds or a minute, and may make the patient unwilling to continue with the treatment. In such a case, and in acutely excited and restless patients in whom intravenous injection might be difficult, a preliminary hypodermic injection of morphine sulphate 0·16 gramme (one-quarter of a grain), hyoscine hydrobromide 0·65 gramme (one one-hundredth of a grain), atropine sulphate 0·65 gramme (one one-

hundredth of a grain) may be given half an hour before the treatment, but the dose of "Cardiazol" solution may have to be increased by 0·5 to 1·0 cubic centimetre.

After the patient is fully round from the convulsion and has regained full consciousness he should be given a meal. He may then get up and pursue, as seems indicated, either his usual routine or a specially prescribed régime of occupation and recreation. When the patient becomes sufficiently accessible and able to cooperate he is given opportunity to discuss his illness and receives explanation, advice and encouragement on general psychotherapeutic lines. The importance of such talks, so greatly stressed by some workers as a vital part of "shock" treatments, seems to vary greatly in different patients. Many, both of the schizophrenic and melancholic type, appear to regain a normal mental outlook as a result of "Cardiazol" convulsion therapy with little or no additional assistance; others call for more individual psychotherapy. The difference perhaps depends on the prepsychotic psychological make-up of the patient. The injections are given three times a week until improvement has taken place, when they are given twice a week. Twenty treatments are considered a full course, but many patients make an apparent recovery with fewer.

Delayed Convulsions.

Rees Thomas and Wilson[2] state that von Meduna has reported to them a delay of three and a half minutes between the giving of the injection and the onset of the convulsion, but that a longer interval has been known. Nightingale[3] has placed on record a delayed reaction of ten minutes, and also secondary convulsions one, three and eight hours after successful injections. He believes that delayed reactions would be observed more frequently but for the common practice of repeating injections after an interval of not more than two minutes. On the other hand, as already mentioned, it is highly desirable to terminate the confusional state by inducing a convulsion.

Recently I gave a man a quick injection of eight cubic centimetres, which had hitherto proved adequate, but this time without success. After the lapse of about two minutes I gave another quick injection of eight cubic centimetres, following which the patient became restless and confused. I noticed no tremors or twitches, and nothing further happened for at least six minutes, when he had a violent convulsion.

With regard to repeating the injections after the failure to produce a convulsion, von Meduna (quoted by Rees Thomas and Wilson) states:

In such cases I advise waiting for two minutes, and if then the confused state which has doubtless arisen after the injection has diminished, the excitement has disappeared and the fine tremor of the eyelids or twitches in the region of the eyes have stopped, without a fit having followed, then assuredly the second dose (i.e., one raised by 0·1g.) can be given. I myself do not need to measure the time exactly after the first injection, but can see after thirty to forty seconds whether an attack is to be expected or not.

Complications.

Dislocations of the jaw or of the humerus are the more common complications, but can to some extent be prevented by careful restraint of the movements. The tampon of corrugated rubber bound round with gauze should be left between the jaws until relaxation occurs. Pameijer[4] has reported fracture, in most instances of the femur, but also of the scapula, humerus or lower jaw, in 15 out of 1,200 cases. Larkin[5] is of opinion that fractures are more likely to occur in long-standing mental hospital cases, when the patients have brittle bones, possibly due to a deficiency in vitamin *D*. Pameijer has also reported seven cases of pulmonary abscess and numerous cardiac complications, with two deaths. Other observers have reported heart block and auricular fibrillation, rarely lasting longer than a few hours. Intense cyanosis may develop from failure of respiration at the end of the clonic stage of the convulsion, but pressure on the chest and other movements are usually effective in reestablishing respiration. Plattner refers to a permanent failure of memory in seven patients who had been subjected to combined insulin shock and "Cardiazol" convulsion therapy, and states his belief that insulin shock alone is unlikely to be followed by mental deterioration unless convulsions have occurred, as may happen with so-called "dry" shock without the use of "Cardiazol". While hardly complications, reference should be made to some unpleasant sequelæ of treatment and to the confusional states which may be produced by an injection not followed by a convulsion. These experiences render a patient unwilling to continue with the treatment. Very seldom do patients complain of anything worse than headache, nausea and general soreness or stiffness after a treatment. A few struggle as they might while going under or coming round from an anæsthetic. An injection which is too small or which is given too slowly may result in a state of mental confusion, usually accompanied by a feeling of apprehensiveness or terror.

Case XXIX.—A man, aged twenty-five years, with a five months' history of depression and other features of a more schizoid type, failed to react fully to an injection and instead became confused for about an hour, during which time he wandered about as if trying to escape from something. After coming round he had a very dim recollection of the episode, but knew that he had been terrified over something. He was not a cooperative patient and did not receive the injections willingly, so that only three were given. He is now in a mental hospital.

In most cases, if a proper fit is induced by a further injection within a minute or two, the patient retains no memory of the first or unsuccessful injection.

Case X.—A man, aged thirty-five years, had failed to make a satisfactory adaptation for many years, but had been able to carry on with his work until the age of thirty-three, when he became depressed and suspicious, and at times gave expression to actual delusions. He also indulged in bouts of alcoholism. He finally became acutely depressed and made a suicidal attempt. He thereupon underwent insulin shock therapy, during which coma was induced on some forty occasions. It appears that he made a good recovery and resumed his profession

and was able to abstain from alcohol. At the age of thirty-five, some two years after the first definite manifestations of psychosis, he again became acutely depressed in the course of a few days, and when seen was dull, retarded, seemed very preoccupied and declared that he felt it was all hopeless. He was kept under observation for two weeks, but his condition did not improve. He was then given "Cardiazol" convulsion therapy and became brighter after the second injection. He refused to have more than three injections and seemed to have regained his normal mentality. Although he reacted well to six cubic centimetres of solution, the activation of distressing memories, the feeling of confusion and helplessness during the "coming round" stage were intensely unpleasant. In contrast, he described the insulin treatment as having been almost pleasurable, like a dreamless sleep.

It may be pointed out that in the course of Sakel's method the brain is reduced to a state of subnormal oxygenation and suspended animation so that the patient is in danger of his life for some seventy hours (thirty treatments with coma for between two and three hours, not to mention a danger period of several hours after hypoglycæmia has been terminated), while with "Cardiazol" convulsion therapy the danger periods may be said to total scarcely as many minutes (twenty treatments with a comatose stage lasting about three minutes on each occasion).

Rees Thomas and Wilson have expressed their opinion in the following words:

In practice the difficulties and dangers are so few that it is fair to say that the treatment is almost universally regarded as easy and safe. Von Meduna, for instance, wrote that in 2,000 injections with over 1,000 fits he never saw any sort of serious complication.

Contraindications.

Myocardial degeneration affords perhaps the greatest risk, especially since the treatment is extended to the depressions of middle age, and even to involutional psychoses. Electrocardiographic examination should be carried out if the state of the heart is in doubt. Systemic diseases and pyrexial conditions are also, of course, indications for the abandonment or suspension of treatment.

Rees Thomas and Wilson mention menstruation and history of trauma with unconsciousness as "contraindications on which no comment is necessary". In the absence of excessive menstrual loss or discomfort there would appear to be no reason for interruption of the course of treatment during menstruation. Indeed the exaggeration of mental symptoms round about the time of the menses, which so frequently occurs, is a definite indication against any interruption of treatment. In the present series treatment has been continued during menstruation, and no ill effects have been observed by the staff or reported by the patients.

In regard to head trauma, there would appear to be no good reason for attempting "Cardiazol" convulsion therapy during post-concussive delirious or confusional states or when definite signs of dementia have appeared. Should, however, a depressive, stuporous or schizoid syndrome manifest itself in the absence of definite pathological rise in intracranial pressure or other definite indication of a cerebral lesion, the question of "Cardiazol" convulsion therapy might well be considered solely on the merits of the psychosis. Without reliable witnesses an accurate history may not be obtained, and notoriously relatives are apt to ascribe sundry ills, especially those of the mind, to an injury to the head.

Case VI.—A boy of nineteen years, of a rather reserved type, had possibly felt a bit "off colour" for a week before. He had some sort of accident while riding his bicycle home from work. He arrived home seeming a bit dazed. He was admitted to the neurosurgical department of the Royal Prince Alfred Hospital, where he remained under observation for a few days and became more dull. There were no abnormal neurological signs, he did not appear to suffer pain, and various other examinations revealed no abnormality. The diagnosis of confusional or depressive stupor was finally made and he was transferred to the psychiatry department. "Cardiazol" convulsion therapy was instituted within about two weeks of the onset of the stupor. At first he showed little reaction, remaining dull, monosyllabic in his responses and unable to give any information. He lay quietly in bed, occasionally rubbing one side of his head, which was not, however, tender on palpation or percussion. After six injections he seemed brighter and thereafter made steady progress. He had a full course of twenty injections. Although he became perfectly alert, he could not give any account of the earlier period of his illness. He said he had fallen or had been thrown off his bicycle, which was damaged, and had a hazy recollection of walking home afterwards; thereafter he seemed to have been in a sort of dream until "things gradually became clear" in hospital.

Principles of Diagnosis Applied to the Present Series.

Melancholia.

The diagnosis of melancholia is applied to cases of persistent depression, coupled with one or more such symptoms as retardation of thought and action, limitation of interests, disinclination for usual pursuits, exaggerated sense of guilt or remorse, hopelessness regarding recovery.

Schizophrenia or Dementia Præcox.

Chronic cases of schizophrenia or *dementia præcox* are, of course, easy to diagnose, and the condition can often be recognized on the history alone of certain significant symptoms extending over a year or two. With the development of out-patient departments and hospital treatment for mental disorders on a voluntary basis the psychiatrist sees more patients in an early stage who do not pursue a steadily downward path. Hence the introduction of the term schizophrenia by Bleuler[7] in 1911.

This disease may come to a standstill at any stage and many of its symptoms may clear up very much or altogether, but if it progresses it leads to a dementia of a definite character.

And:

It is characterized by a specific kind of alteration of feeling and thinking, and of the relations with the outer world that occur nowhere else. [Bleuler.]

With psychotic conditions of recent development it is often difficult to make a definite diagnosis and prognosis. It is a good working principle to suspect schizophrenia the less the symptoms in a doubtful case conform to the manic depressive concept—when

there is no clouding of consciousness indicating a confusional state or an hysterical dissociation. Some observations by Professor Adolf Meyer[8] are of great help:

> There are, as far as I can see, a few general features in evidence that mark the *dementia præcox* course: the oddity, unnaturalness and incongruity of the entire picture in the face of relative clearness, and the tendency to turn on definite complexes, and these especially in spheres which are difficult to reach for an adjustment. The more the odd and unaccountable features prevail and involve the fundamental instincts and longings, the greater the chance for an unfavourable course; further, the more clearly we have evidence of not otherwise justified dissociation processes and of paranoid developments, the more likely is the fate of the patient sealed.

And:

> Existence or development of fundamental discrepancies between thought and reaction, defects of interest and affectivity with oddities; dreamy fantastic (crazy), or hysteroid or psychasthenoid reaction, with a feeling of being forced, of peculiar unnatural interference with thought *et cetera*, frequently with paranoid, catatonic or scattered tantrums or episodes.

Estimates of spontaneous remissions in schizophrenia collected by Rees Thomas and Wilson vary from 5% to as high as 60% of "social remissions or very great improvement". So great are the difficulties in the expression of a dogmatic opinion about recent and transient psychotic episodes in so many of our adolescent and young adult patients that one despairs of assessing and comparing the results of treatment published by so many workers in a bare statistical form. For this reason I have deemed it desirable to include a description of several of the cases in which I have used "Cardiazol" convulsion therapy, both in private and hospital practice.

Results.

In Table I are set out the details of the cases in which complete remission occurred while the patient was in hospital and for at least three months after his discharge. In this series the number of treatments is considered to have been adequate.

In Table II are set out details of cases in which no improvement or only slight improvement occurred; this table includes cases in which the patient failed to complete a full or adequate course.

Table I.

Case Number.	Age.	Sex.	Diagnosis.	Duration Before Treatment.	Number of Fits.	Comments.
I	25	F.	Melancholia.	3 months.	8	
II	16	M.	Instability of adolescence.	3 weeks.	8	
III	19	F.	Acute mania.	2½ months.	11	Improved after four injections.
IV	32	M.	Melancholia.	6 months.	12	
V	25	M.	Melancholia.	4 months.	9	Had felt out of sorts and uneasy for two years before onset of acute symptoms.
VI	19	M.	Stupor.	2 weeks.	20	
VII	16	F.	Acute katatonia.	2 months.	12	
VIII	24	M.	Acute mania; ? schizophrenia.	6 months.	6	
IX	20	F.	Melancholia.	6 months.	5	Improved after first injection.
X	35	M.	Recurrent melancholia.	1 week.	3	
XI	27	M.	Melancholia.	3 months.	15	
XII	30	F.	Melancholia (puerperal).	2 months.	11	Previous attack following childbirth, six years ago.
XIII	23	M.	Schizophrenia.	3 weeks.	11	Following hard study developed ideas of being spied upon, persecuted, food poisoned. Consciousness fully clear.
XIV	21	M.	Melancholia.	1 month.	12	
XV	21	M.	Schizophrenia.	6 months.	20	
XVI	23	F.	Melancholia.	3 months.	18	Improved while under treatment and seemed to become quite well, but has not resumed work.
XVII	29	M.	Melancholia.	1 year mild, 2 months acute.	6	
XVIII	27	F.	Schizophrenia.	9 months.	8	Aural hallucinations and ideas of influence ceased while under treatment.

Table II.

Case Number.	Age.	Sex.	Diagnosis.	Duration Before Treatment.	Number of Fits.	Comments.
XIX	19	F.	Hebephrenia.	1 year.	20	Some improvement. Leads restricted life at home.
XX	27	F.	Stupor.	3 weeks.	14	
XXI	30	M.	*Dementia paranoides.*	8 years.	5	Refused to have more treatment.
XXII	15	M.	Simple *dementia præcox.*	3 months.	20	Restricted life at home.
XXIII	18	F.	Simple *dementia præcox.*	1 year mild, 3 months severe.	20	Restricted life at home.
XXIV	28	M.	Katatonia.	10 years.	20	No effect.
XXV	26	M.	Katatonia.	12 years.	20	
XXVI	16	M.	Schizophrenia.	1 year mild, 6 months severe.	5	Improved, but refused to have further treatment. Further improvement has occurred since discharge.
XXVII	25	F.	Melancholia.	8 months.	3	Improved but refused to have further treatment.
XXVIII	18	F.	Schizophrenia.	6 months mild, 1 month acute.	13	
XXIX	25	M.	Schizophrenia.	5 months.	3	
XXX	28	M.	Schizophrenia.	1 year.	5	Became excited and destructive; removed to mental hospital.
XXXI	28	F.	Simple *dementia præcox.*	5 months.	20	At home but not improved to useful extent.
XXXII	26	M.	Simple *dementia præcox.*	7 years.	20	Not improved.
XXXIII	16	M.	Katatonic stupor.	6 months.	20	From being mute has begun to talk and is showing more interest.

Case III.—A typist, aged nineteen years, became excited, elated and a little noisy. She quietened down but continued to be flippant, irresponsible and elated, and preferred to lie in bed unoccupied for two months. Her foolish demeanour and the absence of any press of activity in speech or action gave one the impression of a schizophrenic colouring. She was then given "Cardiazol" convulsion therapy, and in the course of eleven treatments made a good recovery, which has been maintained so far for seven months.

Case V.—A man of twenty-five years had felt mildly depressed and lacking in energy for about two years. His depression then became more acute and he was admitted to hospital in a state bordering on stupor. Although he had made no complaint of any general or special physical disability and physical examination revealed nothing positive, cerebral tumour had been suspected. He was dull, responded but little, and was almost devoid of spontaneous activity. After a few "fits" he became alert and talkative, and the return of animation in his facial expression was quite remarkable. It was decided to discontinue treatment after the ninth injection, and he has remained well so far for six months.

Case VII.—A girl, aged sixteen years, engaged in clerical work, had felt out of sorts and discontented for about two months, when she was admitted to hospital acutely emotional, restless, incoherent and destructive. She settled down in about a week and seemed perfectly well in the course of a further week. She was then discharged, but was readmitted a week later, again confused and restless. She was menstruating during both these acute episodes. After the second attack, which lasted only five or six days, she seemed dull, apathetic and unresponsive. "Cardiazol" convulsion therapy was then begun and she brightened up after a few injections. Twelve treatments in all were given. She cooperated fully in discussions concerning her case, but all that she could say was that her work had become too much for her. Perhaps, after all, the episodes were merely hysterical.

In the following case toxic factors certainly played some, if not the major, part, and the original diagnosis of hebephrenia must be considered premature; acute mania more correctly describes the condition.

Case VIII.—A man of twenty-four years, a mining engineer, was working in the tropics and began to feel "run down" after several bouts of fever. He then began to drink to excess and also became excitable and restless. He resigned his position from a feeling that he could not tolerate authority any longer. At this stage he was brought to Australia; a provisional diagnosis of hebephrenia was made and some form of shock treatment advised. His family brought him to Sydney from another State for their own convenience during the carrying out of the treatment. "Cardiazol" convulsion therapy was begun within six months of the onset of vague ill health, and within two months of the development of actual psychosis. He was still restless and irresponsible, but no definite distortions of thought were observed. After six successful injections he seemed steadier, but refused to continue with the treatment. He then talked in a rather exalted strain and expressed some grandiose ideas concerning his ancestry. He left hospital, but reported a week later, talking reasonably and with good insight into his condition. A little later he obtained another position in a gold mine and has been at work for six months.

A diagnosis of acute mania, with a toxic ætiology, might have been more correct in this instance. The patient had already improved before "Cardiazol" convulsion therapy was instituted, and it is doubtful whether the course of his psychosis was materially influenced thereby.

Case IX.—A woman of twenty years became depressed over an incident which had given rise to intense conflict resulting in worry and loss of sleep and appetite over a period of about three months. When she came under observation she was deeply remorseful, spent most of her waking life writing out confessions or picking her face to the extent of disfigurement. She made one or two suicidal attempts, which had the appearance of demonstrations rather than of determined efforts. She made no improvement during two months in hospital. "Cardiazol" convulsion therapy was then begun (six months after the onset of the psychosis) and her condition improved after the second fit; she said she had been very foolish in adopting such a narrow attitude and that she now regarded the episode as trivial. She no longer picked her face and quickly regained normal interests. She was given five treatments and has remained well for five months.

Case XI.—A man of twenty-seven years became depressed, self-depreciatory and disturbed by obsessive thoughts. He was by nature of a worrying type. His condition improved somewhat with rest and sedatives, he obtained his discharge from hospital, but returned a week later more depressed. He then became acutely agitated and incapable of coherent speech, but he bellowed in a distressing manner. It was decided to try "Cardiazol" convulsion therapy (three months after the onset of symptoms). He became calmer and spoke sensibly after three or four fits, and he continued to manifest steady improvement. Following our usual procedure, "Cardiazol" convulsion therapy was given three times a week until satisfactory improvement was obtained, then twice a week. He received fifteen treatments in all, and has remained well so far for two months. The dose had to be raised gradually to 13·5 cubic centimetres.

Case XIV.—This boy had been inclined to be moody and irritable from the age of fifteen years. More recently he had seemed to be losing interest. Quite suddenly he became acutely depressed and agitated, expressing remorse over self-abuse. He seemed quite to have gone to the pack, but after four induced convulsions he became calmer, and from then on his condition improved steadily, and before the completion of a course of twelve treatments he was bright and alert.

Case XV.—An art student had found some difficulty in making a satisfactory adaptation to city life after leaving his home in the country. He developed a sense of inferiority and became excessively self-conscious and sensitive, and then expressed ideas that people were hostile towards him for having too great an opinion of himself. He also had ideas of control by another person. At this stage he was unable to carry on with his studies and came under treatment. From being dull and self-absorbed he became bright, but it was not until towards the end of a full course of treatment that he gained insight into his morbid ideas.

Case XX.—A woman of twenty-seven years became depressed, with ideas of reference, two weeks before her admission to hospital, and lapsed into a stupor. She had been somewhat of the shy, seclusive type, but had occupied one position as secretary for eleven years up to the onset of her present illness. After very little change in her condition she was given "Cardiazol" convulsion therapy, and after the third fit became bright and talkative. She was shown at a clinical meeting at the Royal Prince Alfred Hospital in May, 1938 (The Medical Journal of Australia, October 29, 1938, page 751). She received fourteen treatments, during which she seemed to have recovered. Two weeks after the termination of treatment she became hypomanic, but settled down and was discharged apparently recovered. Some weeks later she had to be sent to a mental hospital, where it was recently reported that she was "dull, disinterested and almost mute", but that her physical condition had improved and she had put on weight. Nine months have elapsed since the onset of the psychosis.

Case XXV.—A male patient at the age of fourteen years became dull and depressed; his condition improved and then he developed a maniacal phase. Then further attacks

of depression and excitement occurred, but he also developed peculiarities of conduct and gradually increasing apathy and disinterestedness in between the attacks. Now, at the age of twenty-six years, he is dull and vegetative, but still subject to phases of mild depression and excitement. No effect was observed during the course of "Cardiazol" convulsion therapy, which was given while he was in a depressive phase; a week after the termination of treatment he became excited, restless and mildly aggressive, as often previously. Up to the present, eight months after treatment, he remains as vegetative as ever, while the mild phases of depression and excitement continue.

Case XXVIII.—A girl of eighteen years, of only moderate intellectual attainments, became depressed after her second failure to pass an examination prior to her taking up nursing. She appeared to get over her disappointment in a few weeks and seemed her usual self for about six months. She became quiet for a while and then began to express ideas of telepathic influence. "Cardiazol" convulsion therapy was begun a month after the onset of these psychotic symptoms. She received thirteen injections, and on each occasion reacted well to five cubic centimetres of solution. Throughout she remained happily absorbed in telepathic communications, amusedly watching signs on the walls and listening to messages being tapped out, and she displayed no inclination towards any useful activity. Then she refused to continue with the treatment. Now, six months later, she is even less accessible, and giggles to herself under the bed clothes.

This patient has not received the minimum of twenty treatments recommended by von Meduna for an unfavourable case, but at no time did she show any improvement. She proves an exception to the common experience that a continued successful reaction to the smaller doses of "Cardiazol" indicates a favourable mental prognosis.

In spite of the fact that the melancholics are almost certain to undergo a natural remission in the course of months, and even though recent psychoses with a schizophrenic symptomatology have not invariably an unfavourable prognosis, the application of "Cardiazol" convulsion therapy would appear justified when the duration of an attack may thereby be curtailed. Indeed it appears likely that "Cardiazol" convulsion therapy and perhaps insulin shock therapy will prove to be of greater value in melancholia than in schizophrenia. Von Meduna has admitted that in endogenous hereditary schizophrenia and in cases with a basis of mental deficiency the prospect of improvement with "Cardiazol" convulsion therapy is far less favourable than in "process schizophrenia", that is, cases showing a schizophrenic reaction but with a good constitutional background and perhaps with definite precipitating factors, such as alcoholic excess or an exhausting illness. Rees Thomas and Wilson gained the impression that insulin shock therapy is more effective in paranoid cases and "Cardiazol" convulsion therapy in the stuporose, while hebephrenics and patients suffering from simple *dementia præcox* usually fail to respond to either method. Harris and Birnie[9] have reported favourably on the use of "Cardiazol" convulsion therapy in various forms of stupor. Cook and Ogden[10] have had success in the treatment of mania and melancholia. They also report a favourable outcome in cases of hysteria of long duration. One of these, however (Case X), may well have been a case of recurrent melancholia; but in Cases XI and XII, characterized by emotional instability of an hysterical type, the patients underwent a remarkable change for the better after "Cardiazol" convulsion therapy. Messrs. Knoll report that in 218 cases of "non-schizophrenic preponderantly affective psychoses" 79% of patients were "cured or greatly improved".

As yet no satisfactory explanation is forthcoming as to how "Cardiazol" convulsion therapy acts, although biochemical, circulatory and psychological theories have been put forward. The following contains a suggestion which is perhaps very near the mark:

A boy, like John, gets pneumonia or a large abscess and starts to mend from that day. There are various forms of treatment based on this phenomenon: insulin and "Cardiazol" are the latest of a long string, but I must say this about them, that I think the most they can do is to stir up the whole body so that every defence service is mobilized to the utmost capacity, every cell put on an emergency war-time basis, with the result that—they just scrape through.

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PNEUMONECTOMY: PARTIAL (LOBECTOMY) AND COMPLETE.

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Surgery of the lungs is based on three main principles. The first of these is drainage, chiefly used in the treatment of lung abscesses and empyema. The second is relaxation, the principle underlying nearly all surgical methods for the treatment of tuberculosis of the lungs and of little primary value for non-tuberculous pulmonary

diseases, but sometimes used as a supplementary procedure to operations based on the third principle of extirpation.

Lobectomy has been performed sporadically for a number of years, but has been recognized as a practical operation only since the publication of a paper on the subject by Brunn[1] in 1929, and one of the first successful pneumonectomies was performed by Nissen[2] in 1931. It is not surprising that there is still considerable difference of opinion about the methods of operation.

Operative Methods.

The operative methods may be set out as follows:

1. Lobectomy: (*a*) one stage, (*b*) two stage.
2. Pneumonectomy: (*a*) with use of a tourniquet, (*b*) with dissection of the pedicle.
3. Graham's cautery pneumonectomy.

The advantages of a one-stage lobectomy are apparent and this principle has been widely adopted since Brunn,[1] Shenstone and Janes,[3] Roberts and Nelson,[4] Tudor Edwards[5] and others put it on a sound practical footing.

With bronchiectasis, the chief indication, the risk of soiling the operative field must always be faced and the safety of the operation will depend on control of infection if it occurs. In the pleural cavity infection is less severe if it is localized, and after lobectomy localization can happen only if the remaining portion of the lung is fully expanded and adherent to the chest wall before infection occurs. One-stage operation in the absence of adhesions depends for its safety on early reexpansion and adhesion of the remaining lobe before a bronchial fistula forms or an empyema develops. That this does not always happen is shown by Belsey's[6] statement that atelectasis of the upper lobe has occurred after 40% of lobectomies at the Brompton Hospital and is the commonest complication. Atelectasis predisposes to infection and suppuration in the collapsed lobe and in the pleural cavity. The greatest safeguard was found to be an adherent upper lobe. The presence of adhesions may make the operation much more difficult or even, perhaps, impossible; but if after lobectomy the remaining lobe is universally adherent, the risk of atelectasis is diminished and empyema, if it occurs, is comparatively innocuous.

For this reason in the presence of a free pleura a two-stage operation has many supporters who feel that the double risk to the patient of the two operations and the extra ordeal he has to suffer are justified by increased safety.

At the first operation the pulmonary ligament may be divided and measures taken to ensure the development of adhesions. Churchill,[7] an exponent of this method, points out that adhesions which follow a single traumatic pleurisy are always easily stripped and add little to the difficulty of the operation. By a judicious selection of one- and two-stage operations to suit individual cases he has operated on thirty-eight consecutive patients with one death.

Bethune[8] has described a method of pleural poudrage through a thoracoscope by means of which adhesions can be produced without the disadvantage of thoracotomy, and this method, if it proves reliable, would appear to combine the advantages of the one- and two-stage operations. I have employed it on one occasion with the greatest satisfaction. Lobectomy was done four weeks after poudrage and the lung was universally adherent. The adhesions stripped easily, but were quite sufficient to localize the operative field. I understand that experience of this procedure at the Brompton Hospital has been unconvincing.

Pneumonectomy may be performed through an anterior or a posterior incision, and by amputation after control of the pedicle with a lung tourniquet, or by dissection and individual ligation of the vessels and bronchus. For carcinoma, the dissection technique, which allows removal of the bronchial glands, is essential, but for non-malignant conditions the tourniquet method is satisfactory and is easier.

Graham's cautery pneumonectomy[9] was devised for the relief of localized chronic pulmonary suppuration and found its chief usefulness in the treatment of chronic abscesses. It owes its success largely to the free drainage it provides rather than to radical extirpation and still has a small field of usefulness.

Anæsthesia.

Spinal anæsthesia was used in six of my cases and in every instance gave the greatest satisfaction. Respiration was quiet and the patient's colour always good, and the pleural reflex was completely abolished. Separation of dense adhesions to the diaphragm caused some discomfort, and dragging on the pedicle gave rise to a persistent little cough. A few drops of chloroform were used as a supplement when required.

With nitrous oxide and oxygen, used in three lobectomies and some other intrapleural operations, some cyanosis was always present and respiration was at times laboured with considerable mediastinal movement, which was always conspicuously absent with spinal anæsthesia. One death was, I believe, directly due to anoxæmia associated with the administration of nitrous oxide. Patients with severe lung diseases stand anoxæmia badly, and with nitrous oxide it is difficult to avoid cyanosis if one pleural cavity is open. Cyclopropane is free of this objection; I have tried it once for an anterior exploratory thoracotomy. Respiration and colour were excellent, but any intrapleural manipulation excited an inspiratory spasm which would have made a radical operation impossible. Eversole and Overholt,[10] with a large experience, look on cyclopropane as the best available anæsthetic.

Preoperative Preparation.

The preoperative preparation includes the following: (*a*) a general sanatorium régime, (*b*) the use of postural drainage, (*c*) bronchoscopy, (*d*) the

induction of an artificial pneumothorax, (*e*) the promotion of adhesions by Bethune's poudrage or by a two-stage operation.

In cases of bronchiectasis or chronic lung abscess a few weeks devoted to treatment based on a sanatorium régime combined with efficient postural drainage will result in a striking improvement in the patient's general condition and in a reduction of the severity of his local symptoms. On the patient's return to ordinary life the improvement is not maintained, but it is a very valuable preliminary to operation which should never be neglected. For lessening expectoration and virulence of infection bronchoscopic aspiration is even more efficient than postural drainage; but it is also more distressing to the patient. It should always be practised at least once as a diagnostic measure and as a preliminary to lipiodol bronchography, and when secretion is copious and foul its repeated use is more than justified by the improvement that results.

Pneumothorax should always be attempted and induced if possible before pneumonectomy or lobectomy. Only in this way can information be obtained about adhesions. The disturbance which follows wide opening of the chest varies with different individuals, and, other things being equal, is less in healthy young people than in older subjects. Violent mediastinal movements with Pendeluft phenomenon and paradoxical respiration are seen when, as a result of the opening of the chest, oxygenation of the blood is reduced below the body's requirements; and, as these respiratory efforts are largely abortive, the violence of the movements persists until the mechanism is exhausted. This disturbance does not occur if the lung on the open side is adherent to the chest wall or is held and used as a tractor to prevent the contralateral movement of the mediastinum on inspiration. It does not occur if a pneumothorax has been induced and maintained for seven to ten days before the chest is opened, unless there is obvious evidence of oxygen lack.

As a result of the pneumothorax the patient becomes adapted to the necessity of fully oxygenating his blood from one lung, and this is made easier by the increased flow of blood through the pulmonary artery on the good side owing to the greatly increased peripheral resistance in the vessels of the collapsed lung. Now if the chest is opened the lung on the intact side is able with very little extra effort to supply the body's oxygen requirements and the rhythm of respiration remains unaltered. This is seen beautifully when the chest is opened under spinal anæsthesia. With nitrous oxide and oxygen, on account of the lessened oxygen intake, the mediastinum may tend to be somewhat turbulent.

With spinal anæsthesia a fit of coughing causes momentary turbulence which can be controlled by holding the lung.

Before one-stage lobectomy pneumothorax should not be maintained for more than seven to ten days or it may interfere with early post-operative expansion of the lung. Before pneumonectomy Tudor Edwards[11] advises that the collapse should be maintained for four weeks.

The influence of adhesions in enhancing the safety of lobectomy has already been dealt with.

In modern communities, seasonal waves of respiratory infection cause an increase in post-operative chest infections, and, as Churchill points out, it is wise, as far as possible, to defer thoracic operations during the seasonal periods of this increased risk.

Adjustments to Pneumonectomy.

The adjustments occurring in the lungs as a result of pneumonectomy may be grouped under three headings:

1. Changes in the thoracic cage and diaphragm adjustments.

2. Compensatory changes in the remaining lung: (*a*) emphysema (J. T. Morrison),[12] (*b*) simple dilatation of alveoli (Reinhoff),[13] (*c*) hyperplasia (Hilber),[14] (*d*) reserve of functional units (Behrend and Mann,[15] Longacre, Carter and Quill[16]).

3. Formation of a space-occupying labyrinth.

Changes in the thoracic cage commence immediately after operation and are seen on both sides. On the side operated on the ribs come more closely together, the thoracic dome becomes smaller and lower, the diaphragm is raised and the mediastinum moves over to this side. The thoracic cavity is reduced in all its axes. On the sound side these changes are reversed; the rib spaces are increased, the diaphragm is lower and flatter than normally and the thoracic dome is elevated and widened. Scoliosis, convex towards the side operated on, often occurs.

Following pneumonectomy there is a definite expansion of the remaining lung, so that, in addition to filling the enlarged non-operated side of the chest, lappits of lung tissue extend through the anterior and posterior mediastinum across the midline and occupy some of the space on the side operated on.

According to Reinhoff,[17] the right lung with its three lobes and greater volume is able to occupy more of the dead space than the left lung, and the heart and great vessels adapt themselves more readily to a left-sided pneumonectomy.

Behrend and Mann,[15] from experiments on dogs, believe that the mediastinum is pushed over by the expanded lung and not pulled over by adhesions. If the animal is killed and the sound side of the chest is opened, the lung collapses and the heart then takes up the central position, which it could not do if it was pulled over by adhesions.

In consequence of the enlargement and increased respiratory surface of the remaining lung its functional capacity increases. J. T. Morrison[12] thought this enlargement was due to emphysema. Reinhoff, Reichert and Heuer[13] distinguish the condition of the lung from emphysema by the fact that microscopically the elastic layer is neither

interrupted nor diminished; and they believe that the enlargement is due to simple dilatation of the alveoli. Hilber[14] and others found evidence of true hyperplasia of alveoli, and Longacre, Carter and Quill,[16] and also Behrend and Mann,[15] suggest that the enlargement is due to a full use of the functional reserve which they believe the lung, in common with other vital organs, possesses.

Probably all these changes may occur, and it seems likely that true hyperplasia occurs in young animals before the growing period has ceased and that simple dilatation occurs in adult animals.

Reinhoff[17] states that coagulation of the sero-sanguineous effusion in the empty chest is followed by the formation of a fibrinous scaffolding, and that this later becomes organized into a fenestrated fibrous labyrinth in which are many small cystic fluid-containing cavities. This organized coagulum occupies any space left in the empty chest. Reinhoff believes that this plays an important part in space filling after right pneumonectomy or upper lobectomy on either side.

Indications for Extirpation Operations.

Extirpation operations may be indicated for: (*a*) carcinoma, (*b*) bronchiectasis, (*c*) chronic lung abscess, (*d*) congenital cystic disease of the lung, (*e*) benign neoplasms (adenoma, angioma, fibroma, chondroma, osteoma, myoma, endothelioma), (*f*) hydatid disease (very occasionally).

Carcinoma of the lung is a common disease and constitutes 5% to 10% of all primary carcinomata. Radiotherapy by the methods at present at our disposal is futile, and radical surgery offers the patient his only hope of cure and should always be attempted in the absence of obvious contra-indications. As regards mortality rate and useful survival, pneumonectomy by the dissection technique combined with removal of the bronchial glands should compare favourably with gastrectomy and other major excisions for cancer.

As with carcinoma elsewhere, the secret of success lies in early diagnosis. Although metastases are early and widespread, there is an interval of some months during which diagnosis can be made before dissemination has occurred. The majority of lung carcinomata arise in stem bronchi, and are, therefore, visible to the bronchoscopist, and operation is possible if the growth is not less than two centimetres from the bifurcation of the trachea.

Cough is the commonest early symptom and hæmoptysis and pain in the chest are frequently associated with it. A patient possessing one of these symptoms not readily explained and relieved should be investigated by X rays and bronchoscopy. If bronchial obstruction is complete the affected lobe will be atelectatic, but otherwise there may be little to see in an X ray film. Bronchoscopy is frequently the only means of making a positive diagnosis. Bronchoscopic biopsy and X ray examination after instillation of lipiodol may be required.

The less common peripheral carcinomata arising in small bronchi or bronchioles are more silent and less likely to be found before metastases have developed.

Bronchiectasis and chronic lung abscess may be relieved by conservative measures, but extirpation is the only cure for them; in view of the steady progression to invalidism that is the fate of so many patients, operation should be advised whenever the disease is localized and is progressing.

Congenital cystic disease of the lung is being recognized more and more frequently and is often symptomless. When symptoms are present or the cysts become infected, surgery offers the only chance of cure.

Some benign neoplasms (adenoma, angioma, fibroma) arising in the bronchial mucosa lend themselves to bronchoscopic removal. Others are not likely to be discovered unless they are causing trouble, in which case operation is indicated.

Very occasionally a hydatid cyst may best be treated by lobectomy.

Factors Influencing the Result.

The factors influencing the result are: (*a*) age of the patient, (*b*) location of the disease, (*c*) severity of infection, (*d*) adhesions, (*e*) atelectasis of the diseased lobe, (*f*) recent introduction of lipiodol, (*g*) vital capacity, (*h*) the condition of the blood and circulatory system.

Adjustment to abnormal states is early and more nearly perfect during the growth period, and, therefore, operation should be done as soon as possible if its need is recognized during childhood. With advancing age the process of adaptation is less complete and the risk of operation increased. Carter, Longacre and Quill[18] took a litter of six puppies and removed the left lung from three of them and kept the others as controls. At first the development of the puppies whose lungs had been removed was retarded, but later they almost caught up to their normal litter mates, and after nine months it was impossible to distinguish the puppies by their functional capacities. Adult dogs, calibrated as regards their reaction to exercise and their ability to withstand anoxæmia before and after pneumonectomy, were found to regain only 70% to 80% of their preoperative function.

Obviously disease limited to one lobe offers the best chance of removal and adaptation to removal of a lower lobe is more satisfactory than that following removal of an upper lobe. Bilateral lobectomy has been successfully carried out on a number of occasions.

The influence of infection and adhesions has already been discussed.

When the diseased lobe becomes atelectatic it shrinks and some adjustment occurs in the healthy lung tissue so that its removal causes less disturbance than the removal of a fully expanded lobe.

In bilateral lobectomy this factor should definitely simplify subsequent filling of the dead space.

Belsey,[6] in the article previously quoted, found that post-operative atelectasis was much more frequent and severe in patients who had had lipiodol introduced into their lungs less than eight weeks before operation. He considered that it was safer to defer operation until twelve weeks had elapsed after bronchography. More recent experience at Brompton has not confirmed this finding.

Vital capacity is reduced by the actual loss of lung tissue and even more during operation by the effects of open pneumothorax, and therefore unless lung function is adequate, it is dangerous to attempt radical surgery. Closely associated with vital capacity is the condition of the blood and the circulatory system.

Respiration may be so reduced by anæmia or poor circulation than anoxæmia is produced by a lowering of vital capacity that would normally be harmless; and it follows that operations interfering with respiratory function should never be undertaken until the condition of blood and circulation has been made as nearly normal as circumstances permit.

Conclusion.

In conclusion, I believe that thoracic surgery is in its infancy. Its devotees must command an extensive knowledge of the anatomy and physiology of the thoracic contents and must be familiar with the complexities of thoracic diagnosis.

The thoracic surgeon, more than any other, must acquire the outlook of a physician who operates, and to achieve the cooperation which is so essential for success in this work, the physician must appreciate to the full the possibilities and limitations of surgery.

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PNEUMOCOCCAL PERITONITIS IN CHILDREN.

By Stanley Williams, M.D.

(From the Children's Hospital, Melbourne.)

Pneumococcal peritonitis is such a rare disease of childhood that few doctors will see a sufficient number of cases to enable them to construct a clinical picture. An investigation has been carried out at the Children's Hospital, Melbourne, in order that an impression could be gained of the pathology of the disease and a possible lead obtained for the best form of treatment.

Material.

The incidence of pneumococcal peritonitis at the Children's Hospital, Melbourne, over a ten-year period to 1938 was 45 cases, 14 of which were secondary to a primary disease in other sites than the peritoneum. The remainder (31) were primary or idiopathic. The secondary cases of this disease were due to a septicæmia from a lung infection in all but one case; in this instance the primary focus was in the petrous temporal bone, and associated too with a pneumococcal meningitis. Associated with the pneumonia in seven of these cases we find that an empyema was also present. I do not wish to discuss the treatment of this type of condition, as it is a complication of a serious pneumococcal infection. There is a mortality rate of 80%. Our figures show too that in secondary pneumococcal peritonitis there is an equal sex distribution.

Primary pneumococcal peritonitis occurred in 31 patients, 29 of whom were females; two were male infants, in whom the peritonitis was associated with umbilical sepsis. In all cases included in this series the diagnosis was confirmed bacteriologically in the pathology department by Dr. Reginald Webster or Miss Margaret Green from smears and cultures of pus made either at the operation or *post mortem* examination. It is those primary cases which have occurred in girls that I wish to consider particularly, for there is still some controversy as to the best methods of treatment of the disease and as to the actual site of entry of the organism into the abdomen. The mortality in 29 cases was 14 (50%). The age incidence shows that the age of the youngest infant was five months; there were no patients over the age of eleven years, whilst the largest number of infections occurred at four years of age. Details of the number of children at each age are as shown in Table I. The seasonal variation

incidence does not disclose any particular features, although the disease is not quite so prevalent in the winter as in the summer and autumn.

TABLE I.

Age in Years.	Number of Children.
Under 1	3
1	0
2	2
3	1
4	6
5	2
6	3
7	3
8	3
9	2
10	2
11	2

Mode of Entry of the Organism into the Peritoneal Cavity.

There is no evidence from our cases that a urinary tract infection plays a part—a point of interest in view of the fact that R. C. Johnston[1] suggests that the primary focus of infection may be in the urinary tract.

That the peritonitis is due to a pneumococcal salpingitis with associated vaginitis and a vaginal discharge is the accepted viewpoint of J. E. McCartney and J. Fraser,[2] and whilst I am prepared to agree with this, our cases do not entirely confirm this explanation, for only four patients had a slight vaginal discharge and five had no discharge. In one, however, in which no discharge was present, pneumococci were obtained in a culture of vaginal organisms. In two cases it was not specified whether a vaginal discharge was present or not; one patient gave a positive pneumococcal vaginal smear, and in the other instance, although no pneumococci were seen in a vaginal smear, pus containing pneumococci was expressed from the Fallopian tubes at operation. In the records of thirteen patients no specific mention was made of a vaginal discharge and no attempt was made to grow vaginal organisms by culture. From this section of the inquiry it can be stated that seven of twenty-nine histories examined showed that the children were suffering from a pelvic infection. The operation findings show that in every instance the peritonitis was generalized, whilst in only two was it chiefly pelvic with slight involvement of the peritoneal cavity. In nine instances the Fallopian tubes were sufficiently involved to indicate that here was the portal of entry of the pneumococcus. One must admit the possibility of a resolving or localized pneumococcal catarrhal salpingitis being the site of primary infection for the abdominal cavity without there being macroscopic evidence of Fallopian tube inflammation, for in seventeen of our patients there was no apparent acute infection.

The bacteriological examination by Miss Margaret Green of thirty vaginal swabs by means of smear and incubation showed that children without pelvic infection seldom had pneumococci in the vagina. On the other hand, bacteriological examinations of swabs made from children who have had a gonococcal vaginitis show that pneumococci are frequently quite abundant; yet there has been no instance at this hospital of pneumococcal peritonitis developing in these children. The mere presence of pneumococci in the vagina apparently does not predispose to a pneumococcal peritonitis.

Symptomatology.

The severity of the onset of the disease is shown by the fact that many children were brought to hospital within the first twenty-four hours of the onset of illness; the average time for all cases was two and a half days. Details are as shown in Table II.

TABLE II.

Showing Time of Admission to Hospital After Onset of Symptoms.

Duration.	Number of Cases.
24 hours	14
2 days	4
3 days	3
4 days	5
5 days	1
7 days	1
10 days	1

The predominant symptoms at the time of admission to hospital were colicky abdominal pain and vomiting, whilst of some interest is the fact that only one-third of the patients had diarrhœa. In four cases the pain commenced in the epigastric region and passed to the right iliac fossa, and five children indicated that the pain was in the lower part of the abdomen. The remainder complained of generalized abdominal pain. Examination of the abdomen showed that tenderness and rigidity were generalized in nineteen cases, right-sided in three, and lower abdominal in seven. The outstanding feature is that in most cases the signs were those of a general peritonitis of rapid onset in a female child without a history suggesting an obvious cause. The relative importance of a vaginal discharge has been discussed above. Incorrect provisional diagnoses were made in all except two instances, and I must accept responsibility for two of the errors. In a hospital at which the system of admission is such that a senior resident medical officer confers with the out-patient resident officer before a patient is admitted, the provisional diagnosis is correct in a large percentage of cases. For example, the following were the provisional diagnoses at the time of admission to hospital in 29 cases of pneumococcal peritonitis:

Appendicitis	16 cases
Pneumonia	5 cases
Pneumococcal peritonitis	3 cases
Peritonitis	1 case
Tuberculous peritonitis	
Tuberculous meningitis	
Pyelitis	
Retention of urine	

Discussion.

If we are to make the diagnosis of this condition accurate, the infecting organism must be isolated, and this has been done at operation in most of the cases here considered. Some authorities, including R. C. Johnston,[1] however, consider that early operation is contraindicated, and delay is possible only if a diagnosis of pneumococcal peritonitis is correct. What aids to diagnosis are available? *Paracentesis abdominis* by means of a fine needle and stylet has been recommended by Denzer,[3] who has substituted his technique for that of H. Neuhof and I. Cohen.[4] The method recommended is to pass a number 20 bore five-centimetre (two-inch) long needle and stylet through the skin into the peritoneal cavity 2·5 centimetres (one inch) below the umbilicus, no anæsthetic being required. After removal of the stylet a syringe is connected to the needle and a sample of any fluid present in the abdominal cavity is collected. This fluid can be examined for pneumococci by smear and by cultural methods. I have found abdominal puncture an assistance in one case, and consider it worthy of further trial, particularly when operation is not to be recommended. The dangers of perforating the bowel must be considered, especially when distension associated with peritonitis is present. It must also be borne in mind that appendicitis due to a pneumococcal infection has been described.

The use of the stethoscope applied to the abdomen is recommended by Dean Lewis[5] as an adjunct to other physical signs; but I have found such a variation in the abdominal sounds or an absence of sound in the abdomen of normal children that I doubt its value in the diagnosis of these cases. The stethoscope may help, however, in the differentiation between an acute intestinal obstruction and acute peritonitis. If the diagnosis is certain it seems that it is better not to operate until the pus becomes localized; but as it is sometimes impossible to diagnose this condition, a laparotomy, preferably under gas and oxygen anæsthesia, will be necessary.

Bacteriology of Pneumococci.

In addition to the well-recognized Types I, II and III, we are indebted to the work of Cooper[6][7] and others for serological typing of the heterogeneous Group IV. Many of the 29 types of organisms in this latter group are pathogenic, and for the thorough investigation of pneumococcal peritonitis due regard must be given to both the isolation and the typing of the organism. The recent report of Moore[9] showed Type I to be the infecting agent in ten cases of pneumococcal peritonitis.

Conclusions.

This condition should be borne in mind in the differential diagnosis of acute appendicitis, particularly in female children who are very ill soon after the first appearance of symptoms. One feels that pneumococcal peritonitis is so akin to acute appendicitis that in most instances in which these two conditions are being considered, the correct diagnosis will be acute appendicitis and general peritonitis. Therefore it would appear from the review of the literature and from experience with children that operation will usually be required. If a laparotomy is performed, a smear should be made and some of the pus should be incubated; if pneumococci are present, group typing is indicated.

When the diagnosis is fairly certain without operation, the operation is better delayed and may not be necessary. A diagnostic abdominal paracentesis with examination of the peritoneal fluid for pneumococci may be of value.

If immediate treatment is undertaken, the patient is placed in full Fowler's position and given a free fluid diet. If abdominal distension occurs and there is associated vomiting or dehydration, with or without diarrhœa, continuous intravenous injection of 5% glucose in saline solution can be given. Continued abdominal distension and gastric dilatation may be treated by continuous gastric drainage.

As far as drug treatment is concerned, the use of 2-sulphanilyl-amidopyridine ("M and B 695") in a dose of 15 grains (two tablets) per 20 pounds of body weight per day may be expected to exert a specific effect on this type of pneumococcal infection, similar to that seen already in respiratory pneumococcal infections.

Ten thousand units (15 cubic centimetres) of Felton's typed serum, which costs approximately thirty shillings, may be given intravenously and repeated twice a day for five days or until there are signs of improvement. When the type of pneumococcus causing the infection is known, and the appropriate monovalent serum is available, its use is recommended by several writers.[1][9][10]

Summary.

1. In ten years at the Children's Hospital, Melbourne, there have been 45 cases of pneumococcal peritonitis. Thirty-one have probably been due to a primary infection in the peritoneum, whilst the remainder have been secondary to a pneumococcal infection in the lungs or ears.

2. A survey of the clinical reports of primary pneumococcal peritonitis suggests that the usual mode of entry of the pneumococcus is via the pelvis. This is also borne out by the sex incidence of twenty-nine females and two males.

3. For accurate diagnosis bacteriological examination of the abdominal fluid is necessary. The possible value of abdominal paracentesis is discussed.

4. Conservative treatment with 2 sulphanilyl-amidopyridine, serum, glucose and saline solution given intravenously, and, if necessary, blood transfusion, is advised if the diagnosis is definite. In the majority of cases the diagnosis is doubtful, and operation will also have to be performed.

5. Operation is also necessary if the pus becomes localized to one particular site in the abdomen.

Acknowledgements.

For ready access to case records and permission to publish details of patients under their care I am indebted to members of the honorary medical staff of the Children's Hospital, and also to Dr. Reginald Webster for the benefit of his wide experience in pneumococcal investigations. I have received many helpful suggestions from Dr. E. V. Keogh.

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A COMPARATIVE STUDY OF SOME RECENT SEROLOGICAL TESTS FOR SYPHILIS.

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Commonwealth Serum Laboratories, Melbourne.

DURING recent years a large number of precipitation or flocculation tests for the serological diagnosis of syphilis have been introduced. These include, amongst others, the Meinicke, Eagle, Kahn, Sachs-Georgi, Rosenthal, Müller, Kline, Hinton and Laughlen tests. Their ever-increasing numbers suggest that the authors of new tests have not been perfectly satisfied with the adequacy (including specificity, sensitivity, reliability, simplicity of technique and reading, economy of time and materials *et cetera*) of those they previously used.

Of the precipitation or flocculation tests, those most widely used in Australia are the Kline and Kahn tests. The former, in conjunction with the Wassermann test (Medical Research Council of the Privy Council, method number IV), is the method in use by the laboratories of the Commonwealth Department of Health. Some Australian laboratories rely on one precipitation test, some on one of the many variations of the original Wassermann test, and some use the Wassermann test in conjunction with the Kline or Kahn test. The director of these laboratories (Dr. F. G. Morgan) desired that some of these new methods should be tested in parallel with those, such as the Kline test and Wassermann test, which have proved satisfactory under Australian conditions in the past. The tests decided on were the Hinton test, the Meinicke test (M.K.R. II) and the Müller (M.B.R. II) test, as representative of test-tube flocculation methods, and the Laughlen test, which is a slide precipitation test.

Serological Tests Carried Out.

During the preparation and standardization of the reagents for the Hinton, Meinicke, Müller and Laughlen tests, specimens of serum for testing were collected. These came mainly from the Women's Hospital, the Royal Park and Mont Park Mental Hospitals (mostly treated and untreated patients with general paralysis of the insane), and the State Venereal Diseases Clinic (Male), Lonsdale Street. Included in the latter were specimens of serum from patients with syphilis who had given strongly positive Wassermann reactions when last tested, and others who had given weaker responses after treatment, some having given no reaction at all. One hundred specimens of serum were thus collected, and the six tests—Hinton, Meinicke, Müller, Laughlen, Wassermann and Kline tests—were carried out on each specimen. With the exception of the Kline test in a few cases, all tests were made on a particular serum on the same day, so that they would be more strictly comparable. The serum was selected so that samples from reactors and from non-reactors would be obtained in fairly equal proportions. The five flocculation tests were made strictly in accordance with the technique laid down by their authors. The Wassermann method used was number IV, described in Medical Research Council of the Privy Council: Special Report Series, Number 14, 1918, with fixation at 37° C. In cases in which the results were negative or doubtful, whilst other tests or the clinical history indicated the presence of syphilis, the test was repeated, fixation at 0° C. for four hours being substituted. This procedure will be discussed more fully later. Although when the tests were carried out the notation of results specified by their various authors was followed, for the analysis of results they have been recorded simply as "negative", "positive", "doubtful" or "unsatisfactory". For instance, in the Wassermann test complete hæmolysis with five minimum hæmolytic doses of complement and partial inhibition with three minimum hæmolytic doses would be recorded as "doubtful". When the serum control tube showed inhibition (anti-complementary) the result would be considered unsatisfactory.

Of the 100 specimens of serum tested, there was complete agreement in 81 cases, 42 results being

"negative" and 39 "positive" by each test. The results in the remaining 19 cases are set out in Table I. Cases I, II and III show agreement by five tests, but a doubtful response by one of the flocculation tests. The Hinton, Müller and Kline tests give doubtful reactions once each. These results should not lead to clinical error, as the authors of these tests insist on further serological investigation in such circumstances. In Case IV the response was "negative" by all the flocculation tests; but in the Wassermann test (with fixation both at 37° C. and at 0° C.) a trace of inhibition of hæmolysis was noted with three minimum hæmolytic doses of complement. Such a result would not be regarded as significant without a definite history of syphilis. Case V represents the occasional serum anti-complementary reading obtained in the Wassermann test. Cases VI, VII and VIII show complete agreement of the flocculation and precipitation tests applied to patients under treatment, with a weak or doubtful response to the Wassermann test. Even a weak response to the Wassermann test by patients under treatment would be regarded as significant. Case IX is in the same category, except that the Müller test failed to elicit a definite positive reaction. The serum in Case X was cloudy and proved unsatisfactory for the Hinton test, whilst the Müller response was doubtful. Perhaps it would be fairer to the test to discard it. Case XI proved to be "positive" by all tests except the Laughlen; the response to this was doubtful. In Cases XII and XIII positive results were obtained by all except the Meinicke test; the response to this was doubtful. In both these cases the serum came from patients with general paralysis of the insane who were untreated. In these two instances the serum was not tested on the same day.

Briefly, it may be said that no definitely wrong information was given by any test in these twelve cases. This leaves six cases, XIV to XIX, in which the results of some tests were completely at variance. All of these patients had a definite history of syphilis. A perusal of the table will show that by a combination of the Wassermann test and any single one of the flocculation tests only one infection could have been missed. Case XIX shows that the Wassermann test is sometimes more sensitive than any of the flocculation tests used in this series.

Comparison of Advantages and Disadvantages in the Various Methods.

The points that will be discussed are the following:

(*a*) Ease of preparation of stock reagents, indicators or antigens;

(*b*) their stability, before final preparation for the test, and after;

(*c*) their sensitivity and specificity;

(*d*) the ease with which the result can be read;

(*e*) simplicity of performance of the test;

(*f*) reliability.

Ease of Preparation of Stock Reagents.

I have personally prepared the Hinton, Meinicke, Müller and Laughlen reagents.

The Hinton cholesterolized heart extract was easy to prepare, the directions of Hinton[1] being strictly adhered to.

The antigen for the Meinicke test (M.K.R. II) consists of alcoholic beef (heart) extract, the heart being previously extracted with ether. Balsam of tolu is added as a sensitizing agent, and a little Victoria blue to facilitate the reading of the result. The Müller (M.B.R. II) antigen is made by the extraction of fresh minced ox heart with alcohol for three months, the extraction taking place for at least two and a half months at 21° C. to 22° C. Cholesterol and ether are added as sensitizing agents. These antigenic extracts of Meinicke and Müller were prepared according to the prescriptions

Table I.

Discrepancies in Results.

Case Number.	Test.						Remarks.
	Hinton.	Meinicke.	Müller.	Laughlen.	Wassermann.	Kline.	
I	−	−	?	−	−	−	No history suggesting syphilis.
II	?	−	−	−	−	−	No history suggesting syphilis.
III	−	−	−	−	−	?	No history suggesting syphilis.
IV	−	−	−	−	?	−	No history suggesting syphilis.
V	+	+	+	+	*	+	History of syphilis. Serum anti-complementary in Wassermann test.
VI	+	+	+	+	?	+	Treated for syphilis.
VII	+	+	+	+	?	+	Treated for syphilis.
VIII	+	+	+	+	?	+	Treated for syphilis.
IX	+	+	?	+	?	+	Treated for syphilis.
X	*	+	?	+	+	+	Treated for syphilis.
XI	+	+	+	?	+	+	Treated for syphilis.
XII	+	?	+	+	+	+	General paralysis of the insane; not treated.
XIII	+	?	+	+	+	+	General paralysis of the insane; not treated.
XIV	+	+	+	+	−	+	Treated for syphilis.
XV	+	+	+	+	−	+	History of syphilis 45 years earlier.
XVI	+	+	?	?	−	+	Treated for syphilis.
XVII	+	−	−	−	−	?	Treated for syphilis.
XVIII	−	+	+	+	+	+	General paralysis of the insane; under treatment.
XIX	−	?	−	?	+	?	Treated for syphilis.

Note: − = negative, + = positive, ? = doubtful, * = unsatisfactory.

given by B. Josephson,[2] and it is essential in their preparation to adjust the proportions of sensitizing agents so as to obtain maximum sensitivity and specificity. In the case of the Meinicke test, trial reagents, in which the proportion of balsam of tolu to heart extract is varied, are prepared, and the reaction is tested with known syphilitic and non-syphilitic sera. The mixture of heart extract and sensitizing agent giving the optimum results in extensive trials is selected. The Müller antigen is similarly titrated, the amount of ether being varied. It will be gathered that these two reagents are complicated and somewhat tedious to prepare, whilst, in addition, the Müller reagent requires at least three to four months before it is ready for use.

The Laughlen antigen was prepared in accordance with the directions of G. F. Laughlen,[3] of Toronto, who described the test in 1935. The basic reagent is a modification of the Kahn extract. Cholesterol (0·6%) is added to the Kahn extract, which is then saturated with Scharlach *R*. One part of this mixture, in a test tube, is placed in a water-bath at 50° C., together with a second tube containing ten parts of 1·5% saline solution. After the mixture has been for three to four minutes in the bath, and has been shaken to dissolve the stain, *Tinctura Benzoini Composita* is added to the antigen and the saline solution is poured into it rapidly. After a short period of "ripening" this mixture is allowed to cool and the supernatant portion is decanted. The decanted portion is then sensitized by the addition of small amounts of 9% sodium chloride solution until the correct degree of sensitivity is reached; serum from syphilitics and non-syphilitics is used for the titration. The preparation of this reagent was not found difficult once the correct amount of friar's balsam had been determined by the process of trial and error. The addition of two drops (number 47 Starrat gauge) of friar's balsam to 0·5 cubic centimetre of cholesterol extract proved satisfactory.

The reagents for the Kline and Wassermann tests were supplied by the diagnostic department of the Commonwealth Serum Laboratories. The Kline antigen is prepared according to the directions of the author.[4] The Wassermann antigen is an unmodified alcoholic extract of guinea-pig heart, which is mixed with 1% cholesterol and diluted with normal saline solution just before the test.

Stability of the Reagents Before Final Preparation for Test and After.

The Hinton, Meinicke, Kline and Wassermann stock antigens have been found to keep well, the three first in a dark cupboard at room temperature. The Müller antigen contains ether and has to be kept at 37° C. So far no deterioration has been noticed; but if the bottle is not kept well sealed continuously, the antigen is certain to become unreliable. The Laughlen reagent has been found to keep in the dark for at least three weeks during the cooler months of the year. The effect of a summer temperature on it is not known; but reports suggest that it may then become unreliable within a week.

After final modification for the test proper, Hinton's indicator will keep for five or six days in the cold room. Meinicke's antigen must be used immediately it is ripened at 57° C. for two minutes, after being mixed with sodium chloride (A.R.) in freshly distilled water. This means that all the specimens of serum must be previously pipetted into their tubes. Müller's reagent, after its final preparation at exactly 16° C., will keep for a few hours. The Laughlen reagent, prepared in the manner described in an earlier section, is ready for use without further modification. The Wassermann and Kline antigens, after preparation, can be confidently used any time the same day.

Sensitivity and Specificity.

It is generally agreed by those competent to express an opinion, that no one test is wholly adequate in sensitivity and specificity. Sensitivity can be increased to a point at which specificity is lost, or at least diminished, and *vice versa*. No serological test for syphilis is truly specific, as all tests depend on some colloidal balance of the serum and the reagent. It may be said that all the flocculation tests tried gave good results. No definitely false positive reaction was recorded. In two cases the Hinton test (XVIII and XIX) and in one (XIX) the Müller test gave negative responses when positives might have been expected. It is possible that greater experience with the technique of the tests might have lessened the discrepancies, although the technical details were strictly adhered to.

I have had at least nine years' experience of the Wassermann and Kline tests, and over a period of six or seven years I had performed both tests every week. I had formed the opinion that the Kline reaction was more specific and more sensitive than the Wassermann; but I did not feel justified in relying entirely on the flocculation method. This view has been confirmed by analysis of the results of the present series of tests. An occasional case occurs (*vide* Case XIX, Table I), which demonstrates the value of the Wassermann test. Fixation at 0° C. makes the test more sensitive than fixation on the bench and at 37° C. In the present series there were ten cases in which fixation on the bench and at 37° C. gave negative or doubtful results whilst by the ice-box method the results were positive, and three in which the results were negative at 37° C. and became doubtful (±) at 0° C. In these thirteen cases the patients were all clinically suffering from syphilis, and no flocculation test gave a negative response in any one of them.

Ease of Reading of Results.

Whilst not spectacular, the Hinton test is easy to read and to interpret, as the author of the test lays down clear-cut criteria for it. He records results of tests simply as "positive", "negative", "doubtful" or "unsatisfactory".

There is a choice of four different end-points for the reading of the Meinicke test[5] (M.K.R. II), but in the present series that used was the clarification reading. The test tubes were left overnight at room temperature and the degree of clarification was determined with the naked eye. Reading is easy except when there is very faint clearing. However, the distinction between negative and doubtful readings tends to become accentuated rather than diminished with time, a big point in favour of this test.

The contrast between negative and positive readings in Müller's M.B.R. II test is beautifully clear, and the reading is made three hours after the test has been set up. Some difficulty may be encountered in the differentiation between specific and non-specific flocculation in some cases, but Müller gives criteria for their distinction.

Laughlen's test is easy to read in all but doubtful cases. A serum which gives a positive reaction causes the formation of red particles; these increase gradually in size and tend to accumulate round the periphery of the drop. The result of the Kline test is just as easy to read and interpret as that of the Laughlen test.

Anyone familiar with serological diagnosis of syphilis knows that the ease of reading the result of the Wassermann test depends on correct titration of the various reagents. If the various controls are correct, reading is easy; if they are not, it is difficult and probably valueless.

Simplicity of Performance of Tests.

None of the flocculation tests employed are difficult to carry out. For all tests, except the Meinicke and Laughlen tests, inactivation of the sera is required. For the Meinicke test fresh active serum is specified. Laughlen himself did not inactivate serum for his test. Later reports suggest the advisability of doing so. I have tested some sera, both heated and unheated, with the same results.

The Meinicke and Müller reagents require very careful preparation for the test, the slightest deviation from the technical details laid down, in my experience, resulting in failure.

In all the flocculation tests only serum and antigen or indicator are used, as shown in Table II.

Table II.

Test.	Antigen.	Serum (Undiluted).
Hinton ..	0·5 cubic centimetre.	0·5 cubic centimetre.
Meinicke ..	0·5 cubic centimetre.	0·2 cubic centimetre (fresh, active).
Müller ..	0·5 and 0·5 cubic centimetre.	0·25 and 0·35 cubic centimetre.
Laughlen ..	Drop (Starrat gauge No. 35).	Loop (external diameter 5 millimetres).
Kline	Drop (0·06 cubic centimetre).	Drop (0·015 cubic centimetre).

In the Hinton test the tubes are shaken, placed in a water-bath at 37° C. overnight, and read in the morning.

In the Meinicke test the tubes are shaken, placed on the bench out of a draught, and read next day, whilst, after the contents are mixed, the tubes in the Müller test are put in the water-bath at 55° to 56° C. for fifteen minutes, placed on the bench and finally read after three hours.

The result in Laughlen's test is read after agitation of the slide (on which four specimens of serum can be tested, paraffin rings being used) for ten minutes. It is easy to perform when only a couple of specimens are to be tested, but I did not find it satisfactory to test more than four specimens of serum at once, and preferred having controls on each slide. With the Kline test several specimens can be tested at once and, individually, the test takes only little longer than the Laughlen test.

The Wassermann test involves much more work than any of the flocculation tests, and there are three biological reagents—complement, hæmolysin and sheep's red cells—to go wrong in addition to the antigen.

Reliability.

In my hands little difference in reliability between the Hinton, Meinicke, Müller and Kline tests has been found. The Kline test has appeared to be a little more sensitive, whilst it is no less specific than the others; but previous experience of the Kline test may account for the slightly better results obtained with it by me.

The Laughlen test is not regarded as a suitable test for the bulk laboratory examination for syphilis, and on account of the poor keeping qualities of the reagent and the necessity for employing rigorous controls in isolated cases, its sphere of usefulness is limited to hospital laboratories for emergencies. It should not be carried out casually by a doctor in his surgery.

The sources of error in the Wassermann test are well known.

Discussion.

The results of this small series of tests confirm what has been stressed repeatedly by many serologists, namely, that no single serological test for syphilis is infallible. They further indicate that all the precipitation tests employed are of approximately equal sensitivity and specificity. It is clear that in a few instances a positive serum will be missed if only one test is employed, and, what is equally important, a doubtful result may be wrongly interpreted as evidence of syphilis.

The Wassermann test is more time-consuming than any of the flocculation tests, and by the method employed in the present investigation is somewhat less sensitive. There are, however, reasons why it should not be entirely discarded in favour of flocculation tests. First, much more work and investigation have been carried out by the complement fixation method than by any of the individual flocculation tests, and it is still regarded as the final medico-legal serological proof of syphilis. Secondly, it will sometimes give a

definitely correct result when any one individual flocculation test may fail (Cases XII, XIII and XIX, Table I); and, thirdly, provided that the technique is good the reading of the test is particularly easy and the result clear cut.

My preference is to use a combination of a flocculation test and the Wassermann test. In a large laboratory one of the tube flocculation tests is preferable to a slide technique, as with the latter only a small number of tests can be carried out at the same time and the results have to be read at a short definite time interval after the test has been set up. After a further short period the results cannot be checked without repetition of the test. The slide precipitation tests appear more appropriate in a small laboratory or when a rapid provisional diagnosis is required. A negative response to a Kline test, if adequate controls have been used, is good evidence against syphilis.

The Wassermann test is undoubtedly laborious, and it is questionable whether the labour involved is economically justified when serum from only a few patients has to be tested. The bulk of the work is done before the test proper is set up, so that there is relatively a great deal more time involved in testing a small number of specimens of serum. Further, the larger the number of specimens, the more adequate are the controls. In the small laboratory, therefore, it might be advisable to rely on two separate precipitation tests. Alternatively, and in my opinion preferably, serum might, after being subjected to a precipitation test such as the Kline, be forwarded to some suitable central laboratory for a confirmatory Wassermann test. In these days of air mail no undue delay in the final report should be occasioned.

Summary.

1. The preparation of the reagents for the Hinton, Meinicke (M.K.R. II), Müller (M.B.R. II) and Laughlen tests is recorded.

2. These tests, together with the Wassermann and Kline tests, have been carried out in parallel on 100 selected specimens of serum.

3. An analysis of the results in this series shows complete agreement between all six tests in 81 cases, relative agreement in a further 13, and definite disagreement in 6, these major discrepancies occurring in old-standing cases of syphilis.

4. The desirability of using two tests as a means of minimizing errors in the routine serological investigation of syphilis is indicated.

5. The advantages and disadvantages of the various tests are discussed.

Acknowledgements.

I wish to thank Dr. J. K. Adey, medical superintendent, Acute Mental Hospital, Royal Park, whose courtesy enabled me to obtain large amounts of serum from suitable patients for titration of the reagents and for use in the tests; and Dr. Stanley Williams, who obtained a large number of specimens for me.

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(1) W. A. Hinton: "Hinton Test for Syphilis: Third Modification", *Journal of Laboratory and Clinical Medicine*, Volume XVIII, November, 1932, page 198.
(2) B. Josephson: "*Préparation d'extraits d'antigène pour les réactions syphilitiques de R. Müller et E. Meinicke*", *Acta pathologica et microbiologica Scandanavica*, Volume XIII, 1936, page 502.
(3) G. F. Laughlen: "A Rapid Test for Syphilis", *The Canadian Medical Association Journal*, Volume XXXIII, August, 1935, page 179.
(4) B. S. Kline: "An Antigen for Use in Serum Tests for Syphilis", *Journal of Laboratory and Clinical Medicine*, Volume XIII, March, 1928, page 588.
(5) Ernst Meinicke: "A New Syphilis Reaction, the M.K.R. II in Cerebrospinal Fluids", *Journal of Laboratory and Clinical Medicine*, Volume XIX, February, 1934, page 518.

Reviews.

SEX EDUCATION OF BOYS.

There appears to be no end to the publishing of small manuals on sex education, and "Attaining Manhood" by Dr. George W. Corner, in which a doctor talks to boys about sex, is such another written along the accustomed approach through the sex life of fishes and animals towards man.[1] It is interesting to read, but is somewhat advanced, as it requires a certain amount of knowledge of biology, which in this country is rarely attained until the after-school years, and then only if the reader is attending special classes in biology.

Some of the illustrations would be difficult to understand unless the reader had some knowledge of the subject illustrated.

On the other hand, the author is to be commended for the admirable and sensible outlook on life which he displays, and as a consequence the perusal of the book should be of immense help to many young people who either take the subject too seriously, or on the other hand, too lightly.

SCARLET FEVER.

One might easily imagine that of a disease such as scarletina the last word had been spoken many years ago, and that any further works on the subject might be superfluous. There can be no regrets, however, when it is learnt that George Dick and his wife have decided to publish in one volume their knowledge on a subject which has made them justly famous.[2] The little book is beautifully bound, carefully arranged and attractively illustrated in colour.

After a short history of the disease, the ætiology is discussed. Here the reader follows with interest the hopes and disappointments and ultimate success of these two great research workers in their efforts to prove the hæmolytic streptococcus at fault. Clinically the early diagnostic importance of the rash on the palate is stressed. Attempts at blood culture in most cases are fruitless. Leucocytosis is present, principally polymorphonuclear, but also as a rule there is an increase of eosinophile cells which persists into convalescence.

The immunizing effect of subclinical attacks is pointed out and the importance epidemiologically of persons so affected remaining carriers is emphasized.

Although the name of Pastia is attached to the deep red lines occurring at the folds, and that of Rumpel-Leeds to the production of petechiæ in the folds of the elbow by the

[1] "Attaining Manhood: A Doctor Talks to Boys about Sex", by G. W. Corner, M.D.; 1938. London: W. Heinemann (Medical Books) Limited. Crown 8vo, pp. 78, with illustrations. Price: 5s. net.

[2] "Scarlet Fever", by G. F. Dick, M.D., D.Sc., and G. H. Dick, M.D., D.Sc.; 1938. Chicago: Year Book Publishers Incorporated. Large crown 8vo, pp. 149, with illustrations. Price: $2.00 net.

placing of a rubber constrictor around the upper part of the arm, the diagnostic skin test is simply called the "blanching test" rather than the Schultz-Charlton phenomenon.

In treatment, gentle aspiration of the nasal passages is preferred to douching. A three or four hourly draught of tincture of ferric chloride (one drachm to one pint of water) is preferred to gargles. Daily aural inspection is advised because of the frequency of *otitis media* as a complication. Sulphanilamide, in the experience of the authors, was not useful in the toxic stage, but seemed to be of benefit in the treatment of complications. Antitoxin is advised in apparently mild cases "because it is not possible to predict the course of the disease and it is known that complications are apt to occur in mild as well as in more severe forms of scarlet fever".

The method of isolation is not discussed and the importance of cross infection as the cause of relapses and complications is not made clear.

Eight possible sources of error in the technique of the Dick test are enumerated.

The scarlet fever patient is the usual source of infection. When the source is apparently unknown, contact with an undiagnosed case, subclinical scarletina, scarlet fever without a rash, or an immune carrier is probable. The patient with undiagnosed scarlet fever is frequently admitted to children's surgical wards with suppurative *otitis media* or mastoiditis. Such patients are a potential source of infection to the nursing staff.

The control of epidemics in schools and institutions is clearly outlined.

In the closing chapters the specificity of hæmolytic streptococci is discussed, the doctrine of allergy as a basis for scarlet fever is refuted, and the doubtful diagnostic value of antibacterial immunological reactions is revealed by the lack of consistency in the results obtained by various workers. No satisfactory evidence that streptococcal vaccines are of any value has been produced. A much greater amount of toxin must be administered by the oral than by the subcutaneous route to produce immunity; but the method may be useful in rare conditions such as hæmophilia.

This book should be a useful addition to the physician's library.

THE HYPOTHALAMUS.

A MONUMENTAL work on the hypothalamus has been compiled by four men well equipped for the task, each in his own field.[1] The anatomy is ably reviewed by Professor Le Gros Clark, the functional aspects by Professor Beattie, and the clinical and surgical aspects respectively by George Riddoch and Norman Dott. The book makes fascinating reading. The anatomical section is detailed and complete in its statement of morphology as at present known. The comparative anatomy is well discussed. To the average reader the functional aspect of this small region of the brain will prove more interesting. The widespread functions, which are fully and interestingly set out, include heat regulation, cardio-vascular effects, pilo-motor effects, influence on water metabolism, and bodily reaction to heat. Experimental and clinical evidence is collected as a basis to conclusion.

The relationship of the hypothalamus to the hypophysis is discussed, and there is an interesting contribution on the hypophyseal hormones. Lastly, the problem of sleep is considered in relation to hypothalamic function. Dr. Riddoch writes a fascinating chapter on clinical aspects of hypothalamic derangement, such as bulimia, obesity, glycosuria, sexual and sleep disorders, thermal and blood irregularities, and emotion effects. Ulceration of the upper part of the alimentary tract is discussed in relation to hypothalamic disorder. The diseases resulting in these disorders are then well considered. Mr. Norman Dott contributes much surgical experience, mainly in the form of full case notes of patients who have been under his care for surgical disorders affecting the hypothalamus. One cannot peruse these pages without admiring the dogged persistence and courage with which he has pursued many of his problems, and without being aware of the great value surgery may have in the advance of our knowledge of the subject.

This book is not for the bookshelf of the neurologist only, but is full of instruction and unlimited interest for anybody concerned with the functions of the human organism.

There is a very full reference list, and there is also an author and subject index.

[1] "The Hypothalamus: Morphological, Functional, Clinical and Surgical Aspects", by W. E. Le Gros Clark, D.Sc., F.R.C.S., F.R.S., J. Beattie, M.D., D.Sc., G. Riddoch, M.D., F.R.C.P., and N. M. Dott, F.R.C.S.; 1938. Edinburgh: Oliver and Boyd, for the William Ramsay Henderson Trust. Crown 4to, pp. 223, with over 100 illustrations. Price: 12s. 6d. net.

ALCOHOL AND HUMAN LIFE.

IN the second edition of "Alcohol and Human Life" Dr. Courtenay C. Weeks carries forward the torch of temperance reform.[1] The work is commendable for its restraint. All too frequently propagandists exhibit a zeal which defeats its ends. The author rightly defends the attitude of caution in his foreword.

He states that the caution is the outcome of that restraint which is necessary if, as the Board of Education stated, the subject is to be dealt with in a dispassionate manner "with an appeal to common sense".

This book outlines the menace of alcohol both to national and individual life. The opening chapters deal with the nature of alcohol, the methods of production and the relative strength of various beverages. The author has a word on the insidious cocktail, which he considers is a word derived from cock-ale, a drink used more than 300 years ago. After outlining the nature of protoplasmic life, he enunciates the thesis that the primary action of alcohol is on cell membranes. After the ingestion of a pint of beer, the tissues are under alcoholic influence for at least three and a half hours. Most modern physicians have little use for alcohol in treatment, but their attention is drawn to the widespread use of medicated wines, often the first stage in alcoholic addiction. The average percentage of spirit in these beverages is between 17% and 20%.

During the last few years road accidents have become a menace to life. Those interested will find a useful résumé on the part which the changed reaction time due to alcohol plays in a not inconsiderable number. A somewhat lengthy chapter is devoted to alcohol and food. The author claims that "while alcohol may be a 'fuel' food in the restricted sense of a peculiar and specially framed definition, it is, as the authors of that definition state, in no sense a practical food for healthy men and women, whose food is their source of available energy for the work of body and mind".

In subsequent sections the author outlines the effect of alcohol in the blood, circulation and viscera. He deals with alcohol in the tropics, child and racial poisons, alcohol and the duration of life, narcosis and narcotics. Most readers will concur with the findings and possibly with the conclusions. We ought to think nationally on the question of alcohol, and education should spread the gospel of temperance.

The book has an excellent bibliography. "Alcohol and Human Life" will serve as a volume of reference to all who are temperance minded. For the medical reader there is much of a too elementary nature, but this is inevitable in a book destined for the shelf of the lay reader. It could be profitably handed to "drinking" patients in the belief that it would help them towards abstinence. The problem of dealing with addicts is so difficult we should be grateful to Dr. Weeks for his timely assistance.

[1] "Alcohol and Human Life", by C. C. Weeks, M.R.C.S., L.R.C.P., with a foreword by T. Barlow, F.R.C.P., M.D., F.R.S.; Second Edition, revised and enlarged; 1938. London: H. K. Lewis and Company Limited. Crown 8vo, pp. 464, with 20 illustrations. Price: 6s. net.

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THE AUSTRALIAN ARMY MEDICAL CORPS.

In January of last year an urgent plea was made in these pages for increased efficiency of the Australian Army Medical Corps. The plea was based on the review of a book by Lieutenant-Colonel T. B. Nicholls, entitled "Organization, Strategy and Tactics of the Army Medical Services in War", and on the repeated request of the British Medical Association in Australia that an officer of superior rank should be sent to England to study the latest methods of army medical service. The book was described as one which had been sorely needed, and a dissection of its contents showed that modern developments in army organization demanded reorganization of army medical services — "an intimate knowledge of the parts of the machine and of their interaction, of the best arrangement of these parts and of how they may be varied to meet different requirements".

At long last the Commonwealth Defence Department appears to have adopted the view that "personal acquaintance with individuals, administrative as well as technical, is of much greater value than written instructions from those in high command, and that personal observation is of infinitely greater value than dry-as-dust regulations". The Australian Army Medical Corps can boast but one permanent whole-time medical officer—the Director-General of Medical Services. This officer, Major-General R. M. Downes, is being sent abroad to study the most modern developments in army medical administration, organization, equipment and transport. Major-General Downes left Australia on March 21 on a seven months' tour of India, Palestine and Egypt, the United Kingdom, Canada and the United States of America. He will spend three weeks in India, where the particular matters for enlightenment will be tropical clothing and tentage of troops, hospital buildings, diet, field ambulance and hospital tents, ambulance transport vehicles, mobile X ray outfits, prevention and treatment of tropical diseases, and any advances in medical equipment for Australian conditions that approximate to those of India. In Palestine he will have an opportunity of seeing British troops with their modern equipment under active service conditions. One of the most important if not the most important factor in the visit will be the establishment of liaison with the directors-general of medical services of the army and Royal Air Force in England. Considerable changes have been made recently in the items of medical equipment in England, and opportunity will be taken to contrast similar changes that have been planned in Australia, with a view to the assimilation of anything that is more efficient in the British Army. Major-General Downes will also consult the British Medical Association regarding aspects of recently completed registers of the medical profession ready to serve in time of war, in their relation to the similar registers almost completed in Australia. Other matters connected with the Committee on Coordination of Medical Arrangements, of which an announcement was made in the public Press on March 16, will be the hospital arrangements for the civil population in time of war, and the matter of coordination between the services and the civil authorities for such occasions. Methods of training and the treatment of gas casualties will be investigated, and it is anticipated that considerable advances will be noted in the medical aspects of the Royal Air Force in the

time that has elapsed since the Director of Medical Services, Royal Australian Air Force, Wing-Commander E. A. Daley, was in touch with them last year. In Canada, Major-General Downes will establish personal contact with the Director of Medical Services, Colonel Potter, and will make inquiries into any matters that may be usefully adopted in Australia. In the United States of America it is hoped that Major-General Downes will be able to obtain some insight into the medical services of that army, which might be expected to show valuable examples regarding methods of examination of recruits and gas anæsthesia and of transport of wounded, both by air and motor. It may be mentioned that the tenth International Congress of Military Medicine and Pharmacy is being held at Washington at the beginning of May, and it is expected that three members of the Australian Army Medical Corps will represent Australia at the gathering. Major-General Downes expects to return to Australia at the end of October.

The medical profession in the Commonwealth and the general public cannot fail to approve of this visit, long delayed though it has been. When the air is heavy with foreboding and all are fearful of what the future holds, every Australian will wish the Army Medical Corps to be prepared for any eventuality.

VOLUNTARY AID DETACHMENT SERVICE.

Never before now has the whole Australian community been brought to such a state of consciousness of the possibility of war, and it is doubtful if war was much more universally thought of even in the Great War. This is the consequence of a long period of warnings and of scares ably exploited by the daily Press of all countries. The medical profession, we may safely say one of the most patriotic sections of the community, has not been behindhand in considering what it may do if war came to this country. It was unnecessary for the general body of the profession to make any formal offer of collaboration with the Government; but the assurance made to the Director-General of Medical Services by the President of the Royal Australasian College of Physicians in his address at the inaugural ceremony of the college was a splendid gesture. It is known that a committee has been established by the Commonwealth Government to consider the arrangements for care of the sick and casualties of the civil community no less than for service requirements, and the profession is cooperating in its efforts no less than in the State committees under its jurisdiction.

The *questionnaire* referred to in a previous issue has received a satisfactory response, comparing favourably as regards promptness in reply with the results from a somewhat similar one issued in 1936 by the British Medical Association in the United Kingdom. There is, however, an ancillary of the medical services of the fighting services, the voluntary aid detachments organization, which is not generally well known to the medical profession, but which depends ultimately on the teaching by the latter for its efficiency. Composed in the majority of women, it is organized to reinforce the medical service of the army and to a lesser extent of the navy and air force. It is planned that as well as filling many other auxiliary positions, women shall take the place of many of the personnel of the Australian Army Medical Corps in the general hospitals. The men are mostly expected to act as a reserve for the medical units of the army. The members carry out their training voluntarily, paying for their uniforms, teaching, kit and fares, the Defence Department making a small grant for administrative expenses. The Saint John Ambulance has carried out most of the teaching of first-aid and home nursing in the past—the former through medical practitioners serving voluntarily, though paid in England—while the Red Cross Society, the other partner in the organization, has given considerable help and is entering now on a greater share in the training.

The members as a whole have been keen in absorbing all the knowledge that they have been able to gain; but the medical men who have offered the teaching facilities come from that too small but devoted band which is to the fore in every movement entailing help, sacrifice of leisure and

voluntary service. In most of the States a medical man is at the head of the organization.

There is room for the help of more of the profession; the more that give their services, the better trained will be these attractive and eager "aids", and, who knows, the more limbs and lives will be saved.

Current Comment.

PHRENIC NERVE PARALYSIS IN THE TREATMENT OF PULMONARY PHTHISIS.

In view of their doubts as to the value of phrenic nerve paralysis in the treatment of pulmonary tuberculosis and the indications for its adoption, A. F. Miller and V. D. Schaffner have recorded their experiences.[1] They state that phrenic operations were extensively employed some years ago, but that the results were generally disappointing. In the first wave of enthusiasm unsuitable patients were subjected to the treatment. Inevitably doubt and scepticism followed. The true value of any method becomes clear as its use increases, and Miller and Schaffner, in recording their group of cases as a whole, express the opinion that during the next few years the results of the operation will be more gratifying than heretofore. They do not wish to give the impression that they are performing phrenic operations in an endeavour to avoid resorting to thoracoplasty, as the latter procedure is used more often than the former. However, they consider that operations on the phrenic nerve are not used sufficiently often in Canadian tuberculosis sanatoria. This may be due to faulty performance of the operation; possibly, accessory nerve fibres have been left, with resulting incomplete paralysis or an early return of function. Miller and Schaffner remark that probably in no branch of surgery is the determination of indications and contraindications more difficult than in the surgical treatment of pulmonary tuberculosis. Phrenic nerve operations are in their opinion especially suited for early unilateral lesions with soft infiltrative changes in the upper or lower lobes of the lung. They consider that in such cases these operations are just as effective as the production of a pneumothorax, less troublesome in application, and less expensive. Further, small thin-walled cavities, less than three centimetres in diameter, should be treated by the induction of a temporary phrenic paralysis before pneumothorax is initiated. If the procedure is successful, the duration of paralysis can be prolonged by a second operation. If it is unsuccessful, a pneumothorax can be added without serious loss of time. In many cases collapse therapy is indicated when adhesive pleuritis precludes induction of a pneumothorax. Miller and Schaffner, in their institution, frequently employ the method when it is not possible for the patient to carry on pneumothorax treatment at home. They often find it also of great value as a supplementary measure to reexpansion after lengthy pneumothorax treatment. The method is of value in the control of certain cases of hæmoptysis. There are many patients who suffer from persistent cough and pain in the chest owing to traction upon a lung adherent to the diaphragm, or even owing to traction at the apex. Phrenic paralysis in these circumstances may give gratifying relief. Little benefit, however, can be anticipated when thick-walled cavities exist. Cavities larger than four centimetres in diameter are rarely obliterated by this measure alone. Further, the operation is not indicated when the cavity is peripherally located and is kept open by adherent pleura. Multiple cavitation is not generally helped to any material extent. Benefit is rarely effected in advancing lesions of an active exudative type. Miller and Schaffner insist that a phrenic operation should never be employed as a trial procedure when a thoracoplasty is indicated, nor should it be used as a preliminary to thoracoplasty. The reasons advanced for such an opinion are that when a patient comes to thoracoplasty he should have his maximum of vital capacity. Also, although there is evidence to show that a patient can more effectively clear his lower lobes of secretions immediately after paralysis of the hemidiaphragm has occurred, it would seem that this is not true after some months of paralysis. The authors have found that basal spread is more frequent after thoracoplasty when the diaphragm is paralysed than when it is functioning.

In their discussion on the type of operation indicated, Miller and Schaffner state that the paralysis should be temporary and not permanent, except in few instances. In their own series, up to 1937, only 61 of 250 patients had temporary phrenic paralysis; in 189 instances the paralysis was permanent. However, in many cases the authors regretted the permanency of the paralysis. The first temporary operations consisted only in crushing of the nerve. This was not found to be satisfactory, because diaphragmatic function returned far too rapidly. Now the main trunk is divided and sutured with fine silk. All accessory fibres are divided. This is essential; otherwise a poor result will follow. Comparatively few operative accidents occurred in the series recorded by Miller and Schaffner. One female patient had a Horner's syndrome. The paralysis, after lasting for nearly a year, gradually cleared up. Another patient had moderate hæmorrhage during extraction of the nerve. No deaths followed phrenic exeresis. Post-operative complications were mostly of a minor nature. In one case a contralateral spread of the disease followed a month after the operation and possibly was merely a natural development of the disease. In two cases severe dyspnœa followed

[1] *The Canadian Medical Association Journal*, January, 1939.

left-sided phrenic paralysis. In one of these there was also difficulty in defæcation. The dyspnœa in each instance subsided within two months. In several instances transient dyspnœa appeared, persisting for only a few days or a few weeks. Of the 250 patients, 54 have died. These all died as a direct result of their disease, either by extension or complications. The review of this subject by Miller and Schaffner is most opportune and of conspicuous value.

THE LOCALIZATION OF CARDIAC INFARCTS.

Studies of electrocardiographic changes observed after coronary occlusion have indicated in general that their value is rather qualitative than quantitative. Serial tracings are of course of much greater value than one, and it is also well known that the extent of the damage in any given case cannot be certainly measured by the degree of the electrocardiographic changes. But the work that has been done on the localizing value of the electrocardiogram is of great interest and value; and it is recognized now that in a fair proportion of cases we can gain a tolerably accurate idea of the situation of the main vessels involved, a piece of information which may in itself be of quantitative value and therefore of prognostic importance. It must be admitted, however, that the now familiar classification of electrocardiograms into the so-called anterior and posterior types of infarction is subject to obvious limitations. Indications of how further advice may be possible are given in recent work published by J. S. Robb and R. C. Robb.[1]

These workers are pursuing the question of localization of infarction of the heart from rather a different angle, namely, that of subdivision of the muscle of the heart into four main muscle bundles. They point out that the lack of precision of a purely anatomical localization is due to an oversimplification of descriptive terms. For instance, the right ventricle contains no less than three functionally separate muscles, and the left ventricle four. Obviously no one muscle or muscle bundle is limited to any single aspect of any given chamber of the heart. They prefer therefore to adopt an anatomical basis for describing the muscles of the heart which is simple from the physiological point of view, but which admittedly is not so easily visualized by those of us who are simply accustomed to think in terms of the left or right ventricle. These muscles are: (*a*) the superficial sinospiral, which covers most of the base of the right ventricle, both front and back; (*b*) the superficial bulbospiral muscle, which supplements the sinospiral, which has an intramural portion, and which also takes in the posterior papillary muscle of the left ventricle; (*c*) the bulbospiral muscle, which is a strong circular muscle surrounding the mitral orifice and the aorta; (*d*) the deep sinospiral muscle, which arises from the auriculo-ventricular rings and surrounds the greater part of the base of the left ventricle and also forms part of the septum. It will be seen that the blood supply of these muscles is naturally multiple. Experimental work has shown that damage to the deep muscles, particularly the deep bulbospiral, is a very serious matter, and causes a rapid fall in blood pressure and also ventricular fibrillation. It would seem likely that infarction of this muscle would be a likely cause of sudden cardiac death. In the opinion of Robb and Robb, a comparison of the conventional anteroposterior method of localization with this muscle bundle method encourages the adoption of the latter. They state that there are no pronounced discrepancies when the case records, electrocardiograms and *post mortem* findings are reviewed. They further believe that there are four specific types of electrocardiogram observed in cases of damage to the four chief muscle bundles. If this contention can be sustained it would seem to be of considerable importance. It seems reasonable to prefer a method of localization which can tell us how the muscular function of the heart is likely to be disturbed, rather than one which leads us to think in terms of blood vessels only. Pursuing their work, these authors have also presented 29 cases in which *post mortem* studies have been made, and in which they state that electrocardiographic localization of the muscle bundle affected has been successfully made. The technical considerations involved need not be discussed here; it may be recorded, however, that it is suggested that the depression of the *R-T* interval in Lead I indicates involvement of the superficial bulbospiral muscle, whereas superficial sinospiral damage raises the *R-T* interval in both Leads I and III; the *R-T* interval is depressed in the third lead when the deep sinospiral muscle is damaged, and an extremely high take-off of the *T* wave from the peak of the *R* wave in all leads indicates the lethal deep bulbospiral lesion.

There are some important considerations which emerge from this work, which is perhaps too technical to interest all but a few, and these are as follows. Involvement of the superficial muscles of the heart will often be associated with severe pain, and if the lesion is anterior the familiar friction rub may be heard. Injuries to the deep muscles, on the other hand, may produce varied and atypical sensations of pain accompanied by a severe fall of blood pressure. This brings us back once more to the obvious but often overlooked importance of the purely clinical findings in cases of coronary occlusion. It is well known that patients may recover after a dramatic coronary episode, or may succumb to an accident which produces perhaps less spectacular but far more worrying phenomena, such as grave disturbances of blood pressure. It is easy to see also how repeated infarction of a superficial muscle may occur without fatal result. There is no doubt

[1] *The American Journal of the Medical Sciences*, January, 1939.

about the great diagnostic value of electrocardiography in actual or suspected coronary occlusion; there is also a growing body of evidence that information of prognostic value may also be gained by these means. These studies, however, only accentuate, after all, what the careful clinical observer has all along realized: that close study of a patient's symptoms and signs viewed in the light of mature judgement is just as valuable as it ever was. Finally it is necessary to realize that, however we may cultivate that inward pathological eye which should be part of the equipment of all clinicians, we have to admit that as yet we cannot forecast the conditions of the whole coronary arterial tree in any patient during life.

AGRANULOCYTOSIS AND SULPHANILAMIDE.

The occurrence of granulocytopenia following the administration of sulphanilamide has been reported on several occasions. An extremely difficult problem therefore confronts the practitioner who has to treat a patient with a fulminating hæmolytic streptococcal infection associated at its onset with a complete agranulocytosis. R. F. Ives[1] describes the treatment of such a patient. The illness commenced with sharp lightning-like pains with deep boring sensations in the shafts of the right and left femurs and along the crest of the left tibia. In the course of a day or so the patient, a man fifty-two years of age, developed an indefinite soreness of the throat, with chilliness, a rapidly rising temperature, headache and generalized body pains. At this stage he was first seen by a physician, and the usual treatment for sore throat was instituted. Against advice, but for reasons of economy, the physician was requested to return only if summoned.

Four days later the physician was called again. The pharynx, tonsillar areas and uvula were now covered by one extended mass of greyish-black membrane. The patient was confused and drowsy. The bone pains had ceased and the body aches were less, but the headache, which was localized at the back of the neck, was worse. The temperature was 41·5° C. (107° F.). The injection of 10,000 units of diphtheria antitoxin was without effect. Throat smears and cultures revealed a preponderance of hæmolytic streptococci, but no Klebs-Löffler bacilli nor fusiform bacilli, and spirochætes were found. The leucocytes numbered 1,200 per cubic millimetre, and there was a complete absence of polymorphonuclear cells. The condition of the patient appeared to be desperate. It was decided, in spite of the agranulocytosis, to institute treatment with "Prontosil Soluble" and sulphanilamide, and to attempt to stimulate the bone marrow with injections of "Pentnucleotide" and liver extract. "Prontosil Soluble" was injected intramuscularly in five cubic centimetre doses at four-hour intervals, five times in twenty-four hours. Sulphanilamide ("Prontylin") tablets were crushed and given in watery suspension by means of a nasal tube in doses of fifteen grains four times in every twenty-four hours. In addition, the throat was irrigated at two-hour or three-hour intervals with a hot 0·5% solution of permanganate of potash, and this was alternated with weak solutions of perborate of soda or bicarbonate of soda. Frequent liquid feedings were given by means of a Levine nasal tube, solutions of glucose were given intravenously, and injections of strychnine and of adrenaline were also given. Enemata were given as required.

In response to these measures, the patient's general condition improved; by the seventh day a decided change in the state of the throat was evident. A secondary rise in temperature on the twelfth day of the disease was accompanied by a rapid increase in neutrophile leucocytes. A large retropharyngeal abscess was opened, the excess of neutrophile cells in the blood receded and the patient made a complete recovery. Forty-five days after the onset of the disease the while cells numbered 6,400 per cubic millimetre, 47% being polymorphonuclear cells. During the period of agranulocytosis the red cell count was 4,800,000 per cubic millimetre and the hæmoglobin value was 66%.

An interesting feature of the case is the regeneration of granular leucocytes effected by therapy by "Pentnucleotide" and liver extract while "Prontosil" and sulphanilamide were actually being administered in large doses. Consideration of this makes one wonder whether in some at least of the recorded cases of granulocytopenia following sulphanilamide administration the disappearance of the granulocytes may have been due to the infection rather than to the drug. Sulphanilamide, by the way, is not the only drug of this series which may cause granulocytopenia. This condition has been known to follow the giving of "Proseptasine", while R. V. Cox and J. R. Forbes[1] describe a case of enteric fever in which agranulocytic angina followed the administration of "M & B 693". Enteric fever, of course, usually produces a leucopenia, and an instance of agranulocytic angina complicating typhoid was reported in 1934. But in the present case the agranulocytosis did not appear until after the administration of "M & B 693", although the enteric fever had been present for six weeks before this. The drug was administered for eighteen days, a total of 54 grammes being given. It was suspended after the diagnosis of agranulocytosis had been made. Nucleinic acid was given, together with "Calcium Sandoz", administered intravenously. The patient made a complete recovery. The precautions of the suspension of treatment after ten days and of the performance of leucocyte counts at frequent intervals should certainly never be omitted when drugs of this series are being used.

[1] *Annals of Internal Medicine*, December, 1938.

[1] *The Lancet*, December 17, 1938.

Abstracts from Current Medical Literature.

PÆDIATRICS.

The Intravenous Injection of Hypotonic Saline Solution with Sulphanilamide for Streptococcal Meningitis.

George M. Retan (*American Journal of Diseases of Children*, September, 1938) planned experiments on monkeys to determine whether giving sulphanilamide intravenously in a hypotonic solution of sodium chloride has the advantage of increasing the concentration of the drug in the cerebro-spinal fluid. It has been shown by Long and Bliss that whether sulphanilamide is given by mouth or by subcutaneous or intravenous injection, the concentrations in the cerebro-spinal fluid are practically the same in all cases, and the concentrations in the blood stream are constantly higher than those in the cerebro-spinal fluid. They concluded that, provided the drug is well absorbed from the gastro-intestinal tract, the results are as good when sulphanilamide is given by mouth, the usual method in cases of meningitis, as when it is injected. Most clinicians give the drug by subcutaneous injection also. Intrathecal injections have been used, but as they are not entirely free from danger most physicians feel that they are not desirable. When a hypotonic solution of sodium chloride is given intravenously the osmotic pressure of the blood stream is reduced. This causes a continuous flow of fluid from the capillaries into the pericellular tissue spaces of the central nervous system. The permeability of the capillaries is increased in inflamed tissue. When such solutions are given to patients suffering from meningitis there results a continuous passage of fluid through the capillaries of the inflamed tissue in the central nervous system and through the pericellular fluid spaces. Part of this fluid passes down the Virchow-Robins perivascular spaces, augmenting the lake of cerebro-spinal fluid. Finally, it is largely reabsorbed into the blood stream from the capillaries. Sulphanilamide easily permeates animal membrane and, if added to the hypotonic solution of sodium chloride under the conditions just cited, it will be carried through the inflamed areas. As a result of the experiments on monkeys, the author considers the following conclusions are justified: (i) When a physiological solution of sodium chloride containing sulphanilamide is given to monkeys intravenously, the concentrations of sulphanilamide are greater in the blood than in the cerebro-spinal fluid. (ii) When a hypotonic solution of sodium chloride containing sulphanilamide is injected intravenously the concentrations during the first injections are the same as with the physiological solution. However, if the injection of a hypotonic solution is repeated on the second day there occurs a shift to a higher percentage of sulphanilamide in the cerebro-spinal fluid than is contained in the blood. (iii) A similar shift to higher concentrations in the cerebro-spinal fluid than in the blood can be produced by the administration of the drug by mouth in solution or in capsules prior to the intravenous injection of a hypotonic solution of sodium chloride. (iv) The shift just mentioned depends on two factors: the presence of sulphanilamide in the tissues of the body and the intravenous introduction of a hypotonic solution of sodium chloride containing sulphanilamide. These experiments therefore establish a rationale for the use of intravenous injections of a hypotonic solution of sodium chloride containing sulphanilamide in the treatment of those types of infection of the central nervous system for which sulphanilamide has been shown to be useful. The author reports the history of a patient successfully treated by this method, and gives details of the procedure adopted.

Lead Poisoning.

Irving Kowaloff (*American Journal of Diseases of Children*, October, 1938) presents a case report with clinical and laboratory data in support of the theory that administration of a phosphorus-rich diet is the rational treatment of acute lead poisoning. In the pædiatric service of Dr. Benjamin Kramer several patients with acute plumbism have been successfully treated with a high phosphorus diet to which phosphate was added in the form of a 10% solution of disodium phosphate. The patients who presented symptoms of lead encephalopathy were first treated with large doses of sedatives to control their convulsions. They were then given a 10% aqueous solution of disodium phosphate, 10 cubic centimetres being administered three times a day. The basic diet consisted of a quart of milk and two eggs daily. To establish the diagnosis of lead poisoning a radiological study of the long bones was made, the blood smear was carefully examined for stippled red cells, the blood and urine were analysed for lead, and the protein of the spinal fluid was measured. Accessory treatment in the form of a blood transfusion was given if the anæmia was severe. A patient was considered to be successfully treated if the clinical condition improved, and in addition the lead concentration of the blood was considerably decreased. The case reported by the author is given in great detail, because it was possible to obtain repeated and complete analyses of the blood during the course of treatment. Not only do the results afford evidence of the validity of the principle of the solubility product constant for lead phosphate dissolved in blood serum, but they supply some data which indicate the exact chemical form of the lead salt in the blood. The analysis of the blood involved exact simultaneous chemical determinations of the calcium, phosphorus and lead content. The lead concentration of the whole blood was determined, and the calcium and the phosphorus concentration of the serum. The case reported is one of lead encephalopathy in which improvement was produced by adequate sedative and a diet high in phosphorus, to which 30 cubic centimetres of a 10% solution of disodium phosphate was added daily. Evidence is presented to show that in this case the lead concentration of the blood was determined by the lead-phosphorus product constant of the blood. This constant, expressed in simplest form, is the product of the lead concentration in milligrammes *per centum* of whole blood and the inorganic phosphorus concentration in milligrammes *per centum* of serum. Since there is good evidence that the principle of the solubility product constant is valid for the lead phosphate of the blood, a diet high in phosphorus (producing a higher content of inorganic phosphorus in the serum) would appear to be the most rational method of decreasing the lead concentration of the blood.

Role of Copper in Iron-Deficiency Anæmia in Infancy.

James H. Hutchison (*The Quarterly Journal of Medicine*, July, 1938) has reviewed the literature regarding the role of copper in iron-deficiency anæmias, and has carried out metabolism studies in nine cases of nutritional anæmia in infancy and childhood. The latter investigation has revealed: (*a*) That the administration of copper enhances the conversion into hæmoglobin of iron stored in the tissues. (*b*) That iron given in doses so small as not materially to raise the hæmoglobin content of the blood can, by subsequent administration of copper, be mobilized and converted into hæmoglobin. It is suggested that copper, acting as a catalytic agent, enables iron to be converted into such a form that it can be transported by the blood plasma from the storage depots to the bone marrow, where it can be utilized in the formation of hæmoglobin.

Physiological Scoliosis.

John G. Kuhns (*Archives of Pediatrics*, June, 1938) draws attention to the prevalence of a slight lateral deviation of the spinal column in children. The condition is symptomless and shows little tendency to become worse. It is often unnoticed by parents, and is usually first discovered by physicians or school nurses. It occurs in at least 5% of the school population. Physiological scoliosis is recognized as a mild lateral deviation of the spine associated with slight prominence of the back on the concave

side of the spinal curvature, and with almost complete disappearance of the curvature in recumbency. It is caused by muscular weakness, incoordination and unequal function of the supporting muscles of the trunk. Faulty posture is always associated with it, and since it leads to muscular weakness and dysfunction, it must be corrected if a lasting cure of the lateral curvature is to be maintained. Treatment should be directed first to the general health, nutrition and adequate rest of the child. Then training should be given to improve the function of the musculature, to straighten the spine, and to correct the faulty posture. Treatment must be continued for at least three months after the disappearance of the curvature, to prevent the recurrence of the deformity. Rapid increase in the curvature is rarely seen. In adult life the curvature persists as a slight noticeable deformity, and makes the back weaker and more subject to strains.

ORTHOPÆDIC SURGERY.

Chronic Synovitis of the Knee Joint.

GEORGE A. L. INGE (*The Journal of the American Medical Association*, December 31, 1938) traverses the history of the treatment of chronic synovitis of the knee joint by synovectomy, and enumerates the rules governing selection of cases by previous writers. The operation should be performed only in cases of non-specific arthritis. The disease should be localized in the synovial membrane, with little or no involvement of cartilage or bone. The patient should have had all foci of infection removed if possible, conservative treatment should have been given adequate trial, and there should be considerable effusion within the joint. The disease should be confined to one or at most to two joints. The acute inflammation should have subsided. The author analyses the late results of 86 complete synovectomies performed at the New York Orthopædic Hospital between 1923 and 1937, the average "follow-up" period being 5·6 years. In nine of these cases the knee was the site of specific disease (tubercle bacilli 6, hæmangioma 1, hydatid disease 1, osteitis of the tibia 1). The tuberculous patients were operated on because of mistaken diagnosis, and all required subsequent fusion of the knee. In the remaining 77 cases of chronic non-specific arthritis of the knee operation was performed on 58 patients, there being 19 bilateral synovectomies. The oldest patient was 70 and the youngest 6 years of age, and the average age for the series was 36·1 years. The cause of the synovial inflammation differed widely: rheumatoid arthritis 26 cases, osteoarthritis 20 cases, chronic proliferative synovitis (including 9 cases of trauma and 6 of osteochondromatosis) 31 cases. The whole series of patients had sought relief by conservative therapy for an average of 5·2 years. No patient had reacted to the Wassermann test. Radiological study was of little use in estimation of the probable outcome of synovectomy. The operative technique was fairly uniform, although operation was performed by 28 different surgeons; two vertical parapatellar incisions were used and the synovial membrane and infrapatellar pad were removed, but when healthy the menisci were left undisturbed. Gentle passive and then active motion were begun within forty-eight hours in almost all cases. Traction was applied for one to two weeks in twelve cases with no noticeable benefit. None of the joints was manipulated under anæsthesia after operation, but two required plaster wedging for correction of flexion deformities. No deaths and no wound infections occurred. Bacteriological investigations yielded nothing of interest except for a short-chained hæmolytic streptococcus in one case. Pathological examination showed that whatever the cause of the inflammation, whether rheumatoid arthritis, infectious synovitis or chronic trauma, and regardless of the clinical result of operation, the pathological changes in the synovial membrane were basically the same in all cases. It was not possible to base a prognosis on histological examination. The author states that Key and Swett have shown that hypertrophied synovial membrane may regenerate after excision; but relief of pain would seem to depend on regeneration of a relatively normal, thin, glistening membrane, hence the plea for synovectomy only when all active inflammation in the joint has subsided. He claims satisfactory results in 74% of his cases (that is, complete or considerable relief of pain, improvement in function or very little loss of function). He considers that synovectomy offers the most promise for symptomatic improvement, next for anatomical improvement, and least for functional improvement.

The Healing of Joint Fractures.

K. O. HALDEMAN (*The Journal of Bone and Joint Surgery*, October, 1938) describes the results of an investigation into the reparative powers of the articular cartilage after injury. The article is based on a study of specimens removed at operation during a period of eight years, and also on experimental work with rabbits in which injuries to the articular cartilage were produced by closed methods and at operation. Twenty-eight specimens of cartilage and subchondral bone were removed from patients suffering from fractures extending through the articular cartilage and ranging in duration from five days to twenty-eight years. Three instances of replacement of connective tissue by hyaline cartilage occurred in two carpal bones affected by degenerative changes of many years' duration, and in a tarsal joint that had been incompletely arthrodesed eleven months previously. In the remaining cases there was no evidence of metaplasia. This explains the permanent disability that so often follows fractures involving weight-bearing joints, and indicates the importance of accurate anatomical replacement of fragments in such cases. Such metaplasia is more likely to follow a severe injury involving destruction of subchondral bone. The author concludes from his experimental work that repair takes place by invasion of fibrous connective tissue from the underlying bone, in which, after several months, areas of replacement by hyaline cartilage may appear. He states that complete immobilization of injured joints favours the formation of intraarticular adhesions, which tend to produce degenerative changes in any articular surface to which they may become attached.

Osteoarthritis of the Hip Joint.

T. P. MCMURRAY (*The Journal of Bone and Joint Surgery*, January, 1939) discusses osteoarthritis of the hip joint in two groups, according to whether the condition is unilateral or bilateral. The unilateral cases are further subdivided into two subgroups. The first comprises those in which the pathological changes have followed either an alteration in the mechanical relationship between the head of the femur and the acetabulum, or a single severe injury to the articular surfaces. The second subgroup is composed of those cases in which no simple mechanical influence or traumatic history can be adduced as a cause of the disease. The bilateral cases can only occasionally be attributed to trauma, although the changes may differ widely in degree on the two sides. The important sequela from a mechanical point of view is a decreasing range of movement, which must ultimately be compensated for by an increasing range in associated joints. Treatment varies from elimination of septic foci, the use of physical therapy and manipulation or rest to surgical operation. For the first sub-group of the unilateral type arthrodesis would be justifiable were it not liable to be followed by spondylitis in the lumbar region. In the second sub-group it is especially necessary to retain movement in the joint, so that the spine and other hip may not be unduly strained. For this condition the author has performed oblique osteotomy of the femur in 42 instances with the object of transferring some of the body weight from the pelvis directly through the shaft of the femur, and also of rotating the head of the femur so that a new portion of the articular surface takes the remaining weight. Sound union occurs in three and a half months, and complete relief of pain with retention of 50% of the movement present prior to operation can confidently be expected.

British Medical Association News.

SCIENTIFIC.

A meeting of the New South Wales Branch of the British Medical Association was held at the Renwick Hospital for Infants, Summer Hill, on November 17, 1938. The meeting took the form of a series of clinical demonstrations by members of the honorary staff.

Rickets.

Dr. W. D. K. Craig showed a male baby, aged ten months, the ninth child of its mother. The child had previously been in the Renwick Hospital suffering from diphtheria. It had been admitted to hospital on October 20, 1938, with a history of pains in the arms and legs and of having refused food for a month. The child was a seven months' premature baby. Its weight at birth was two pounds four ounces. For three months it had been breast fed and then it was given dried milk with barley jelly and sago. The child had had orange juice daily and one drachm of emulsion three times a day.

Examination on his admission to hospital, the baby was found to be under weight—ten pounds twelve ounces. No abnormality was discovered in either the circulatory or respiratory system. Frontal bossing was present in the head, and the anterior fontanelle was normal. A well-marked "rosary" was present, the abdomen was distended and the musculature was hypotonic. The teeth had not erupted. On X ray examination signs of rickets were found. The patient's erythrocytes numbered 3,600,000 per cubic millimetre, the hæmoglobin value was 59%, the colour index was 0·8, and the leucocytes numbered 16,300 per cubic millimetre.

The child was given a cow's milk mixture and concentrated doses of vitamins *A* and *D*; it was also exposed regularly to sunlight. Injections of liver extract were given every week and iron was given by mouth twice a day. Dr. Craig said that improvement in the child's condition had been steady, though rather slow. After one month the blood calcium content was 11·4 milligrammes *per centum* and the blood phosphorus content 5·2 milligrammes. The weight had increased to eleven pounds ten ounces, the "rosary" was less pronounced, and the muscular tone had improved.

In further discussion of the case Dr. Craig said that the fact that the child had rickets and anæmia was not surprising. Children born with a deficiency of calcium were particularly prone to rickets, and as the fœtus acquired two-thirds of its calcium during the last three months of intrauterine life, premature children were born with a calcium deficiency. The same might be said of infantile anæmia, as again two-thirds of the iron was laid down during the last three months of intrauterine life. Dr. Craig expected that, under appropriate treatment, the child would do quite well.

Pink Disease.

Dr. Inglis Robertson showed a child which manifested clearly some of the characteristic signs of pink disease. There was first of all the utter misery of the baby. The redness of the hands and feet was very apparent, and the desquamation of the hands was perhaps more pronounced than usual. The stools were normal; this was Dr. Robertson's usual experience. These children were difficult to feed, but if they were given the food appropriate to their age they as a rule digested it perfectly. Photophobia was not a prominent sign here, but the baby was very dark, and brunettes did not suffer from photophobia to the same extent as blondes. The latest books from England still referred to pink disease as an avitaminosis. To that Dr. Robertson could not subscribe. He had had babies who developed the disease on every possible diet. Many of them were entirely breast fed, and there was no reason to suppose that the diet of the mother was lacking. He had given all the known vitamins without the very slightest effect upon the disease. Further, he had not had a single case in which the disease recurred, and if this condition was an avitaminosis recurrence would sometimes be expected. Everything seemed to point to the condition's being an infective disease conferring complete immunity on recovery. Dr. Robertson's feeling was that it was a virus disease with a method of spread similar to that of poliomyelitis. He would like some interested party to try the effect of treatment by immune serum. There was quite a definite death rate; indeed the prognosis should always be guarded. The very rapid pulse rate was a cause of concern, and a rising pulse rate a matter for anxiety. Dr. Robertson thought that in pink disease they had one of the epidemic nervous diseases and that it might be looked upon as a complication of what was in the vast majority of cases a comparatively trivial disease. The infection might go through numerous children before it reached a particularly susceptible child, when pink disease became manifest. Progress would be made only when the cause had been definitely established.

Dr. W. D. K. Craig also showed a male baby, aged nine months, the first child of its mother. The previous history was clear. The child had been admitted to hospital on October 14, 1938, with a history of anorexia, irritability, sleeplessness and loss of weight for one month, and of a generalized body rash for four days. At birth the child's weight was eight pounds ten ounces. It had been breast fed for ten weeks, and on admission to hospital was having cow's milk and milk foods, with two drachms of emulsion every day.

On examination the child was found to be a miserable squirming infant with generalized hypotonia. Photophobia was present. The gums were inflamed and the hands and feet were cold, red and clammy. A generalized irritable rash was present. The pulse rate varied from 140 to 160 in the minute. The child's weight, on its admission to hospital, was eighteen pounds six ounces. The tonsils were enlarged and the teeth had erupted. X ray examination of the bones revealed mild rhachitic changes. Both the blood count and the sedimentation rate were normal. The child had been treated on general hygienic lines and endeavours had been made to see that sufficient nutriment was taken. In view of the rhachitic changes, vitamins *A* and *D* were given, together with vitamins B_1 and B_2. Symptoms were treated as they arose. The child was discharged at the request of the parents, and Dr. Craig said that as a matter of fact these children did better at home, and the danger of cross-infection was removed.

Dr. Craig further said that the cause of pink disease was still undetermined. Probably it was the result of an infection, perhaps the infecting agent was a virus. Many eminent authorities considered it a deficiency disease and blamed the vitamin *B* group. Feeding was a real difficulty in the treatment of affected children. It was better to give a small amount of food often than to attempt forcible feeding. The pulse rate was "a good prognostic sign"; with an increasing rate the outlook was bad. Even in favourable cases patients took some months to recover.

Rickets, Scurvy and Bronchopneumonia.

Dr. Craig's third patient was a male baby, aged seventeen months, the sixth child of its mother. The child had been admitted to hospital on October 17, 1938, with a history of having been off colour for one month. It was restless at night, was feverish, sweated, was losing weight and was constipated. At birth the child had weighed nine pounds. At the time of its admission to hospital the child was having a mixed diet. No abnormality was detected in the circulatory or alimentary systems. The child was listless, its temperature was 38·1° C. (100·6° F.), the pulse rate was 136 in the minute and the muscles were flabby. X ray examination revealed mild rhachitic changes and fine catarrhal changes in the lungs. The child's condition improved until November 1, 1938, when bronchopneumonia developed. This gradually resolved by lysis. About this time the gums became inflamed and three teeth fell out.

Examination of the urine revealed the presence of red blood cells. The only abnormality in the blood count was that the erythrocytes numbered 4,000,000 per cubic millimetre.

On admission to hospital the child was given concentrated vitamins *A* and *D* and was exposed freely to sunlight. Orange juice was given with an appropriate mixed diet. The bronchopneumonia received appropriate treatment. On the discovery of signs pointing to scurvy the amount of orange juice was increased, and from that time the improvement in the child's condition was much more rapid.

Commenting on this case, Dr. Craig said that children of this age taking a diet such as this child took before its admission to hospital did not usually develop scurvy. Scurvy was a disease which ran true to form. Given an adequate supply of vitamin *C*, scurvy did not occur. With an inadequate supply of vitamin *C* scurvy often developed, to clear up as if by magic when vitamin *C* was added to the diet. This was not true of rickets, as signs of rickets were often seen in children whose diet, according to present standards, was perfect and whose little bodies were beautifully bronzed by a plentiful supply of sunlight.

Pneumococcal Pyelitis and Bronchopneumonia.

DR. H. V. P. CONRICK showed a male baby, aged four months, which had been admitted to hospital on October 17, 1938, with a diagnosis of pyelonephritis. The child did not seem acutely ill. Its temperature was 39·1° C. (102·4° F.). Resonance was slightly impaired over the anterior aspect of the right lung. The breath sounds were puerile and diminished over the right lung anteriorly. The erythrocytes numbered 3,500,000 per cubic millimetre, the hæmoglobin value was 55%, the colour index was 0·8, and the leucocytes numbered 10,000 per cubic millimetre. The erythrocytes were slightly irregular in size and shape and were deficient in hæmoglobin. The increase in leucocytes was due to an increase in the number of neutrophile cells. The urine was acid and contained many pus cells; many pneumococci were present. Pneumococci were also found in a smear from the eyes. No Klebs-Löffler bacilli were found in a swabbing from the throat.

On October 29, 1938, numerous pus cells were still present in the urine.

On November 17, 1938, fine moist crepitations were audible at the base of the right lung and also, though to a less extent, in the left. The respiratory rate and the pulse rate were very rapid. The child then developed a severe bronchopneumonia.[1]

Spontaneous Pneumothorax.

Dr. Conrick also showed a female baby, aged nine months, the sixth child of its mother. The child had been admitted to hospital on July 26, 1937, with a history of having had pneumonia one month previously. Shortly before its admission to hospital the child was said to have had a very violent coughing spasm, which lasted for four hours; after the coughing spasm the child was "blue".

Examination at the time of the child's admission to hospital showed that the nutrition was good. The temperature was 37·5° C. (99·6° F.) and the pulse rate was 160. The child was slightly cyanosed, breathless and irritable. The clinical signs were indefinite and X ray examination revealed complete hydropneumothorax on the right side, the cause of which was not apparent. The left lung was clear. At about the middle of October clinical improvement began to occur. The child was eventually discharged from hospital convalescent.

The Radiological Diagnosis of Pneumonia in Children.

DR. ERIC FRECKER displayed a series of films illustrating the diagnosis of pneumonia in infants. He presented typical specimen films showing characteristic consolidation in the various lobes and its differing distribution in the various grades and varieties of pneumonia. It was emphasized how early the diagnosis could be made by the use of the X ray method and how exactly the anatomical situation of the lesion could be defined. Complicating empyema could be detected in the initial stages. Dr. Frecker stated that it was the custom at the Renwick Hospital to take repeated films of the lungs of every patient suffering from chest infections of any kind. Patients with actual pneumonia were thus examined two or three times a week, and as a result the clinicians were rarely in doubt as to the course of events within the thorax. It would seem as a result of these experiences that the use of X rays in the acute respiratory infections of infancy had a wide sphere of usefulness, more particularly as physical signs in these small patients were notoriously deceptive. The objection to the movement of the patient could be easily overcome by the use of a ward machine or portable apparatus.

Unresolved Pneumonia.

DR. DONALD VICKERY showed a boy, aged fourteen months, who had been first seen by Dr. Vickery on October 24, 1938. The child had been very irritable for two weeks; he had been off his food and feverish, and had been treated as though he was teething and suffered from influenza. The child was constantly winging, he resented being touched, and had occasional bouts of grunting respiration. He was pale and hypotonic, but his skin was somewhat dry. His temperature was 38·7° C. (101·8° F.), and his pulse rate was 156 in the minute. Examination of his chest revealed no accompaniments to his breath sounds, and the percussion note was unimpaired. The child had developed a cough during the two days prior to his admission to hospital. He had no frequency of micturition or scalding. His bowels were constipated. His urine was acid and clear; it contained no albumin, pus or sugar. The blood picture was one of microcytic hypochromic anæmia with neutrophilic and lymphocytic leucocytosis, the blood count being as follows:

Erythrocytes, per cubic millimetre	3,610,000
Colour index	0·7
Leucocytes, per cubic millimetre	16,550
Polymorphonuclear cells	70%
Lymphocytes	25%
Monocytes	5%

On October 26, 1938, X ray examination revealed a right-sided central pneumonia, involving the lower and middle lobes and portion of the upper lobe.

The child was given a quarter of a tablet of "Prontosil" four times a day, and his condition steadily improved, the temperature falling by lysis. After nine days the "Prontosil" administration was stopped. At no time were there any pronounced accompaniments to the breath sounds, but the percussion note became impaired and the breath sounds diminished on October 27, 1938.

On November 7, 1938, X ray examination showed that the pneumonic area was diminishing; the child's general condition became much improved and the temperature became normal. The von Pirquet test elicited a positive response with both human and bovine strains.

Dr. Vickery said that the child's maternal uncle had died at the age of ten years from tuberculosis of the hip joint and spine; otherwise there was no family history of tuberculosis. The child's pneumonic condition had been atypical of all the usual types of pneumonia of early childhood: firstly, in its position (surrounding the hilar region), and secondly, in its semichronicity. These two facts, in conjunction with the strongly positive reaction to the von Pirquet test, made him entertain the possibility of a tuberculous infection of the hilar glands. An X ray examination at a later date should be of interest.

Hirschsprung's Disease.

Dr. Vickery then showed two brothers, the elder aged two and a half years, and the younger ten months.

The elder boy had first been seen when he was thirteen months old, in March, 1937. The mother complained that the child had suffered from extreme constipation since

[1] After the meeting the child lost weight. The condition of the eyes cleared up. Pituitrin, "Cardiazol" and diginutin were all used in treatment; "Carbogen" was given when necessary. On November 27, 1938, the child's condition was somewhat improved and hope was entertained of its recovery. It died, however, on November 27, 1938.

birth. His bowels were rarely open except by means of enemata. Occasionally he had bouts of offensive diarrhœa lasting two or three days. During the first three months of life the child had been treated at "Tresillian" for vomiting.

The child was thin, pale and toxic looking. He weighed 20 pounds. He was bright and virile. His tongue was coated. Abdominal distension was present and hard scybalous masses were palpable in the caecum, ascending, transverse and descending colons. The colon was visibly dilated and visible peristalsis was present. X ray examination showed that the rectum was considerably enlarged, but the ascending and transverse colons did not appear to be unduly dilated.

On March 17, 1938, the child commenced systematic emptying of the bowels by means of high saline or soap and water enemata every second or third day, according to symptoms. Belladonna and *Nux Vomica* were given in a mixture and "Bemax" was given every morning at breakfast. Except for a very occasional normal bowel action very little improvement in the child's condition took place, except as far as his general health was concerned, until September, 1937. After this the child became independent of having his bowels opened by means of enemata.

On April 8, 1938, it was noted that no enema had been given for two months, but the child continued with the mixture and the "Bemax".

On May 6, 1938, it was noted that the child had had two normal bowel actions every day for the previous month. His health was excellent and no fæcal masses were palpable in the abdomen.

The younger brother was first brought for advice on April 8, 1938, when he was three and a half months old. The mother said that the child was constipated and had vomited occasionally for three weeks. The constipation was relieved by paraffin given twice a day. The child was a moderately well-nourished, virile, active baby boy. His abdomen was slightly distended, but no scybalous masses were palpable. The child was admitted to hospital for investigation in August, 1938. X ray examination revealed dilatation of the rectum, descending and transverse colons, but not of the ascending colon. He was being treated by saline enemata and "Bemax" and had manifested some improvement.

In discussing these two cases Dr. Vickery said that there was no doubt that the elder boy was suffering from true Hirschsprung's disease; he had always fitted into the clinical description of the disease. The condition of the younger boy appeared to be milder, though the X ray appearances looked typical. There was no stenosis of the anus or lower rectal region in either case. Vitamin *B* complex in the form of "Bemax" was given on the ground that it had to do with the maintenance of normal gastro-intestinal tone; and Dr. Vickery was of the opinion that it had been of considerable benefit to the elder boy.

Rheumatoid Arthritis.

Dr. Vickery also showed a child, aged three years and three months, who was suffering from rheumatoid arthritis. When the child, a girl, was seen at the age of twenty-one months, she was suffering from pain in the left knee joint and left wrist joint. Interphalangeal joints in the left foot and left hand were also affected. Limitation of movement, pain and fusiform swelling were present. The patient was treated by a course of twelve doses of "Myocrysin". After the second dose had been given the pain completely disappeared and progressive improvement took place until five months later, when some pain recurred in the affected finger joints. The child was then readmitted to hospital and her tonsils and adenoids were removed. Dr. Vickery explained that the child had remained healthy since that time, the joints were gradually becoming less swollen, and full range of movement was returning. Dr. Vickery had seen arrest of rheumatoid arthritis follow removal of a septic focus, but the relief of pain and the arrest of a pathological process in a joint had never been so dramatic as in this case.

(To be continued.)

Correspondence.

THE ALLEGED PAINFUL SEQUELÆ AND POOR RESULTS OF ANTROSTOMY.

Sir: In his excellent article in your issue of February 25, 1939, Dr. Watkins again sounds a warning against radical operations in cases of allergic nasal disease. The possibility of allergy seems sometimes to be completely forgotten and the condition is mistaken for some sort of chronic infection. The result of operation in these cases is generally disappointing and may be disastrous, as in an appreciable number of cases a particularly intractable form of asthma ensues within a few weeks or months. Recently, in England, Francis and other authorities on the subject have emphasized this danger and have pointed out that particularly disastrous results follow if the patient is hypersensitive to aspirin. Francis says that if the patient is hypersensitive to aspirin, has nasal polyposis and a low blood pressure, any sort of nasal interference is liable to make things worse. This has been emphasized for many years and yet it is frequently forgotten. For instance, today I saw a patient who had a bilateral radical antrum operation done towards the end of 1938. On the eve of the day fixed for operation he was given a sedative containing aspirin, and for the first time in his life he was seized with violent asthma, so alarming that the anæsthetist had to be called late at night to cope with it. Next day his condition was so poor that the operation had to be postponed for several days. This upset with aspirin should surely have been sufficient warning, as the patient had polypoid degeneration and a low blood pressure. However, after several days a double radical operation was performed, and on recovering consciousness the patient found himself in the grip of severe asthma. This has persisted almost continuously since, and experience with many similar cases makes it seem unlikely that anything really effective can be done for it.

One sometimes sees cases in which fairly obvious hay fever seems to have been missed. For instance, a medical friend consulted me twelve months ago regarding mild asthma, which had appeared some months after a bilateral radical antrum operation which had been performed two years previously. He also complained of frequent "colds" and nasal discomfort, which he had had for several years and which had not been benefited by the operation. Tests showed quite marked sensitiveness to feathers, kapok, "house dust" and grass pollens, and within two months of starting desensitizing treatment the chest and nose symptoms disappeared almost completely. It is interesting to note that this patient was operated on in November. In Australia grass pollens become plentiful in October, and the resulting reaction in the nasal mucous membranes is sometimes apparently mistaken for the effects of sepsis, although there is no doubt that allergic irritation may predispose to bacterial invasion.

These cases are quoted, not in any spirit of criticism, but in the hope that they may help in the avoidance of similar errors. It is obvious that the definition of the ideal surgeon as "a physician who is compelled to operate" is a good one; but who can be expected to remember all the minute medical points which bear on surgical judgement?

All physicians must be impressed by the ingenuity and dexterity brought to bear by surgeons in tackling the great technical difficulties of nasal surgery; but, seeing things from a different angle, they sometimes find that some "tremendous trifle", such as hypersensitiveness to aspirin or other allergy, has been missed. Allergy is a comparatively new arrival in the medical field, and it will be many years before it will be accepted at its true value. In the meantime those who have the opportunities of seeing large numbers of allergic cases should emphasize those facts which are of critical importance to workers in other specialties. Two facts should be keenly sought in the history of all patients with chronic nasal discomforts: (*a*) do symptoms vary with season? and (*b*)

do they vary with changes of environment? If they do, it is probable that pollen or some other "extrinsic" factor is of great importance as a cause, and quite simple skin tests will clinch the matter. Ultimately, when the importance of allergy is recognized, it seems likely that no radical nasal surgery will be undertaken without this preliminary careful questioning and tests with perhaps twenty of the most important causes of seasonal and perennial hay fever. These tests can be done in about thirty-five minutes, and generally the results fit in so satisfyingly with the history that one can be sure that they are significant. If there is marked evidence of hypersensitiveness it is often possible to avoid the irritant once it is identified and the risk of a poor operative result is avoided.

Yours, etc.,

CHARLES SUTHERLAND.

71, Collins Street,
Melbourne,
March 7, 1939.

PROPERTY AND HEALTH.

SIR: It is encouraging to read an article such as that written by E. P. Dark, of Katoomba, and published in your edition of March 4.

Perhaps the most pleasing feature of the article is its demonstration that at least some members of the profession realize their responsibility to society in the matter of health as well as illness.

In the last fifty years we have learned a great deal about disease, but society as a whole does not know, or at least does not practise, the cult of health as it should be practised with all the facilities which are available. I hope that it will not be thought that I am criticizing medical practitioners, for they, especially in Australia, perform very ably their function of curing disease or relieving suffering.

Organized society should have gone far beyond the stage at which we still stick, namely, that the medical attendant gets his patient up and about and then says: "Well, you ought to be all right now; let me know if you have any more trouble." It has become the function of the State not only to prevent disease when it can, but also to provide proper convalescent facilities where disease has occurred in spite of all preventive measures.

This function or rather these two functions are the duty of the State, and the cost of them should not fall on the individual, no matter what his financial circumstances may be.

Sociologists, although their voices are like those crying in the wilderness, have been pointing this out for years; but if these opinions were made part of the policy of the British Medical Association then there would be quite a bright prospect of their adoption by politicians.

Dark's article shows with stark realism what sociologists and most doctors have known vaguely for many years. I suppose that no one but a fool would say he did not believe in preventive medicine; but if you believe in preventive medicine, then you must believe in all the ramifications of it and in all the things it involves. So far we have been inclined to look on prevention as vaccination, inoculation and various other semi-scientific procedures: but these are probably of less importance than certain other things, which up until now have been considered outside the realm of medicine.

Dark's figures show quite clearly that healthier people come from those strata of society which have good food, good houses and good clothes. It is also quite obvious that under the present organization of society very large groups of people are not able to get these things, and that until they can get them the nation cannot be healthy. If it is agreed that obtaining these things is part of preventive medicine, then it is up to the British Medical Association to set about obtaining them. The usual argument used against giving people more money to buy food is that they only waste the extra money on gambling or luxury. This is no answer to the problem at all.

I have never been able to see the difference between water and any of the other essential commodities, like bread and meat. To my mind the logical contention is that there should be so much of all of them that it would not matter if much were wasted, just as much water is wasted. If this is to be done, then all essential commodities, and perhaps many luxuries, will have to be taken completely out of the realm of profit-making, and vested either in the State or in some other bodies not trading for profit. After all, it is not particularly logical to say that water, gas and electricity may not be part of the unrestricted profit system, whereas bread, butter and meat may.

Company directors, whether their business is bricks or bread, see only one thing—figures. If the figures are right, then the business is successful, and it is not theirs to reason why. Many of the men I know would be deeply grieved and shocked to know the drive that is going on below somewhere to secure these figures.

We comfort ourselves with the thought that "things are not as bad as they were". That is not the point. Things are still quite unnecessarily bad in many quarters, and part of the work of preventive medicine is to change them for the better.

In the meantime the great thing is to arouse the medical conscience, especially the official medical conscience, to the fact that good food and good houses are as surely a part of preventive medicine as are vaccination or inoculation.

Yours, etc.,

PHILIP PARKINSON.

British Medical Association House,
135, Macquarie Street,
Sydney.
March 13, 1939.

THE BACILLUS COLI COMMUNIS AS A FACTOR IN THE CAUSATION OF SYPHILIS OF THE NERVOUS SYSTEM.

SIR: The nervous system for many years seems to be unaffected by the organism of syphilis, and the reason for this is the cause of much speculation.

It seems that the *Spirochæta pallida* requires another organism to cause a lesion, and when there is one necrotic tissue is produced and the spirochæte grows. Leondite and Lepine state: "It is not the spirochæte which produces the lesion but the lesion produces the spirochæte—that is the infravisible form meeting with dead cells in damaged tissue becomes the visible or spirochætal."

Tuberculosis has been considered by some as doing this, but it seems to me the organism is the *Bacillus coli communis*, which in some way or another is related to the tubercle bacillus. Ferran, of Barcelona, a bacteriologist of repute, since 1897 has affirmed that "Koch's bacillus" is derived by a series of mutations from the *Bacillus coli communis*, but, as Vaudremer says, this assertion can neither be proved nor disproved.

It looks to me as if the toxins of the *Bacillus coli communis* damage some of the nerve cells and so prepare the way for the activity of the spirochæte, just as the staphylococci do in the case of skin lesions. Arsenic and bismuth act on these, but do not against the *Bacillus coli communis* infection. I have a feeling that if we watched the *Bacillus coli communis* infection in middle-aged people and used an autogenous vaccine, a good deal less would be heard of syphilis of the nervous system.

Yours, etc.,

J. MORRIS ROE.

Victory Chambers,
Queen Street,
Brisbane.
March 17, 1939.

TRIGEMINAL NEURALGIA.

Sir: After reading Dr. Lyons's communication in The Medical Journal of Australia on January 21, 1939, I wrote to him to suggest that from the description of his own symptoms before operation it is likely that he had not in fact been suffering from a true paroxysmal trigeminal neuralgia, and also to condemn his action in adversely criticising the surgical treatment of *tic douloureux*, since it is a common experience among those who treat this condition surgically that an adequate operation in cases of real paroxysmal neuralgia offers a safe, certain and permanent cure. With great courtesy Dr. Lyons replied to my letter, giving me fuller details of the early history of his condition and his subsequent experiences with numerous operations and their after-effects. After reading Dr. Lyons's letter I was left with mixed feelings of admiration for his fortitude in being able dispassionately to discuss his sufferings, and deep regret that his original condition had not been recognized as periodic recurrent supraorbital neuralgia. Without disclosing the contents of Dr. Lyons's letter to me, I personally have no doubt from his very exact description of the situation, character, duration and periodicity of his symptoms that this was indeed the correct diagnosis.

This condition, which is rare, is described by Wilfred Harris in his book "Neuritis and Neuralgia". Harris states: "I have tried, and others also, alcohol injection of the supra-orbital notch with only occasional good result . . . There is, however, no certainty in the treatment of this type of neuralgia, such as can be practically guaranteed in paroxysmal *tic douloureux*."

In my own experience of this condition, limited to four cases, alcohol injection produced relief in one case. In a second case avulsion of the supraorbital nerve four months ago has so far kept the patient free from pain. In the other two cases neither injection nor avulsion was of any value. It would be most unwise to submit a patient suffering from periodic supraorbital neuralgia to the operation of Gasserian sensory root section when the condition is well recognized as being extremely intractable and resistant to all forms of treatment. Harris goes so far as to say: "The only really satisfactory way of cutting short the attacks which I have been able to devise is to give daily an anticipatory injection of morphine and hyoscine."

I attach to this letter for publication at its conclusion tabulations of my own small series of cases of true paroxysmal neuralgia which I have treated either by operation or by injection. I hope that the good results to the patient, the safety of the procedures and the absence of complications or sequelæ may help to convince those in general practice, who first come into contact with the unfortunate sufferers from *tic douloureux* and who are therefore compelled to shoulder the responsibility of advising them about treatment, that a safe and certain remedy is available when the correct diagnosis is made.

Yours, etc.,

131, Macquarie Street,
Sydney,
February 24, 1939.

Gilbert Phillips.

Treatment by Operation.

Name.	Age.	Sex.	Operation Date.	Divisions Involved.	Symptoms Since Operation.	Complications.
M.H.	41	F.	3/3/35	Left maxillary.	None.	None.
T.K.	68	M.	4/2/36	Right maxillary and mandibular.	None.	None.
D.M.	40	F.	11/2/36	Left ophthalmic, maxillary and mandibular.	None.	None.
M.J.	47	F.	21/3/36	Right maxillary and mandibular.	None.	None.
E.K.	54	F.	1/10/36	Right maxillary and mandibular.	None.	None.
J.C.	34	F.	1/10/36	Right maxillary.	Right intraorbital pain on 2/3/38.	None.
A.D.	46	F.	16/4/37	Right maxillary and mandibular.	Pain commenced on left side 8/9/37.	None.
S.K.	39	F.	25/8/37	Right maxillary and mandibular.	None.	None.
A.C.	36	F.	19/10/38	Right maxillary and mandibular.	None.	None.
J.C.	36	F.	24/11/38 (second operation)	Right maxillary.	None.	None.

Treatment by Injection.

Name.	Age.	Sex.	Injection Date.	Nerve Involved.	Symptoms Since Operation.	Complications.
T.K.	68	M.	5/9/34	Right mandibular.	Recurred January, 1936.	None.
E.H.	46	M.	16/1/35	Left mandibular.	None.	Transient diplopia.
M.T.	65	F.	20/7/35	Right mandibular.	None.	None.
H.L.	50	M.	13/12/35	Right mandibular, right infraorbital.	None.	None.
E.M.	46	F.	20/5/36	Right mandibular.	None.	None.
T.B.	72	M.	31/8/37	Right mandibular.	None.	None.
J.A.	63	M.	14/7/37	Right infraorbital.	None.	None.
A.H.	40	F.	16/7/37	Right mandibular.	None.	None.
E.R.	71	F.	25/11/37	Left mandibular.	None.	None.
M.M.	63	F.	12/2/38	Right infraorbital.	None.	None.
E.C.	59	M.	16/2/38	Right infraorbital.	None.	None.
M.H.	46	F.	26/2/38	Left supraorbital and infraorbital.	None.	None.
G.N.	64	F.	28/2/38	Left mandibular.	Slight twinges of pain.	None.
J.C.	34	F.	5/3/38	Right infraorbital.	None.	None.
M.A.	75	F.	12/3/38	Left mandibular.	Slight twinges of pain.	None.
J.S.	42	F.	25/5/38	Right mandibular.	None.	None.
			21/6/38	Right infraorbital.		
			28/6/38	Right mandibular.		
E.A.	75	F.	11/5/39	Left mandibular.	None.	None.
			1/6/38			
R.C.	23	M.	21/7/38	Right supraorbital.	None.	None.
G.P.	68	M.	14/6/38	Right mandibular.	None.	None.
			19/7/38	Left intraorbital.		
J.C.	35	F.	6/9/38	Right infraorbital.	Slight twinges of pain.	None.
			13/9/38	Right infraorbital.		
B.M.	66	M.	19/10/38	Right infraorbital.	None.	None.
A.F.	44	M.	19/10/38	Bilateral infraorbital.	None.	None.
E.H.	45	F.	7/12/38	Left infraorbital.	None.	None.

A CRICKET MATCH BETWEEN DENTISTS AND DOCTORS.

The annual cricket match between teams representing the medical and dental professions in Sydney was played at the Sydney Cricket Ground on February 22, 1939. It resulted in a win for the medical men by 108 runs on the first innings. The dentists were led by C. S. Winning and the doctors by R. H. Bettington. Winning won the toss and showed sufficient confidence in his bowlers' skill to send the doctors to the wickets. His confidence seemed justified when first Priddis, then Vickery, returned to the calm serenity of the Members' Pavilion without having done anything to cause a pronounced acceleration in the scorer's rate of metabolism. But Halliday and Bettington became associated in a display of forceful and attractive batting, which subdued the dentists' hopes of an easy victory. However, the remaining batsmen were easily removed, most of them yielding to the persuasive measures employed by the gentle N. I. Blue. The team was dismissed for 217, of which Halliday and Bettington between them had made 162.

The dentists succumbed rapidly to the doctors' varied methods of attack, making a total of only 109. A feature was an excellent innings of 52 by A. Lawes. The early wickets were secured by Vickery and McIntosh; Ross obtained two and Stevenson one. The remnants were skilfully removed by Bettington. We have not been informed of the type of premedication that he employed.

The contest was interesting at every stage and at times exciting. The cricket was attractive.

Hitherto this match has been arranged by a number of enthusiastic cricketers of both professions; might we suggest that in future years it should be an official function arranged jointly by the British Medical Association and the Australian Dental Association?

Scores.

Doctors: First Innings.

G. C. Halliday, retired	79
K. Priddis, c. Hall, b. Turnbull	4
I. Vickery, b. Winning	4
R. H. Bettington, c. Hutchinson, b. Lawes	83
G. McIntosh, b. Lawes	5
A. W. Ross, stpd. Hall, b. Blue	0
F. G. N. Stephens, b. Blue	6
W. L. Calov, c. Keyte, b. Blue	6
J. Goldman, c. Lawes, b. Blue	7
B. W. Stevenson, not out	9
E. A. Tivey, stpd. Hall, b. Blue	7
Sundries	7
Total	217

Bowling: C. S. Winning, 1 for 57; S. M. Turnbull, 1 for 43; J. O. Stenmark, 0 for 36; A. Lawes, 2 for 26; N. I. Blue, 5 for 36; F. Hutchinson, 0 for 12.

Dentists: First Innings.

J. K. Brooks, c. Priddis, b. Vickery	0
B. Hall, l.b.w., b. Vickery	3
G. Saggers, l.b.w., b. McIntosh	17
A. Lawes, run out	52
O. Keyte, l.b.w., b. Bettington	1
J. O. Stenmark, b. Ross	29
F. Hutchinson, l.b.w., b. Ross	2
W. Edwards, run out	1
C. S. Winning, c. Ross, b. Stevenson	1
S. M. Turnbull, b. Bettington	1
N. I. Blue, not out	2
Sundries	0
Total	109

Bowling: I. Vickery, 2 for 15; W. L. Calov, 0 for 16; R. H. Bettington, 2 for 27; G. McIntosh, 1 for 25; B. W. Stevenson, 1 for 20; A. W. Ross, 2 for 6.

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

The undermentioned has been registered, pursuant to the provisions of the *Medical Act*, 1912 *and* 1915, of New South Wales, as a duly qualified medical practitioner:

Caffell, Thomas Enwright, M.B., Ch.B., 1932 (New Zealand), c.o. Bank of New South Wales, Sydney.

QUEENSLAND.

The undermentioned have been registered, pursuant to the provisions of *The Medical Acts*, 1925 *to* 1935, of Queensland, as duly qualified medical practitioners:

Atkins, Donald Stewart, M.B., B.S., 1938 (Univ. Sydney), Camooweal.

Black, Robert Cecil, M.B., B.S., 1939 (Univ. Sydney), Brisbane.

Burt, Laurence Ian, M.B., B.S., 1939 (Univ. Sydney), Brisbane.

Hains, John Ivan, M.B., B.S., 1939 (Univ. Sydney), Brisbane.

Hoy, Ronald James, M.B., B.S., 1939 (Univ. Sydney), Brisbane.

Hutcheon, Jack Roy, M.R.C.S. (England), L.R.C.P. (London), 1934, Brisbane.

Laing, John Joseph, M.B., Ch.B., B.A.O. (Dublin), 1924, Brisbane.

Samuels, John Harris, M.B., B.S., 1939 (Univ. Sydney), Brisbane.

Sapsford, Derek Pelham, M.B., B.S., 1939 (Univ. Sydney), Brisbane.

Obituary.

DEAN DAWSON.

We regret to announce the death of Dr. Dean Dawson, which occurred on March 18, 1939, at Adelaide, South Australia.

Nominations and Elections.

The undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Haselton, Alan Richard, M.B., B.S., 1939 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Nelson, Edna Lillian, M.B., Ch.M., 1920 (Univ. Sydney), 141, Macquarie Street, Sydney.

The undermentioned have been elected members of the Victorian Branch of the British Medical Association:

Prescott, Neil Furphy, M.B., B.S., 1937 (Univ. Melbourne), Prince Henry's Hospital, Melbourne, S.C.1.

Phillips, Lewis Leon, M.B., B.S., 1927 (Univ. Melbourne), Bank of New South Wales Chambers, 190, Bourke Street, Melbourne, C.1.

Walker, Herbert Frederic, L.R.C.S. (Edinburgh), L.F.P. and S. (Glasgow), 1903, 252, Pakington Street, Geelong West.

Forsyth, William Leigh, M.B., B.S., 1938 (Univ. Melbourne), Royal Melbourne Hospital, Melbourne, C.1.

Uhd, Karl Neilson, M.B., B.S., 1936 (Univ. Melbourne), Austin Hospital, Heidelberg.

Hutchings, Jean Alison, M.B., B.S., 1937 (Univ. Melbourne), Children's Hospital, Carlton.

O'Reilly, Margaret Linnell, M.B., B.S., 1939 (Univ. Sydney), Queen Victoria Hospital, Mint Place, Melbourne.

Dobson, Arthur John Mandeville, M.B., B.S., 1937 (Univ. Melbourne), Royal Melbourne Hospital, Melbourne, C.1.

Diary for the Month.

Apr. 4.—New South Wales Branch, B.M.A.: Council.
Apr. 5.—Western Australian Branch, B.M.A.: Council.
Apr. 5.—Victorian Branch, B.M.A.: Branch.
Apr. 6.—South Australian Branch, B.M.A.: Council.
Apr. 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
Apr. 14.—Queensland Branch, B.M.A.: Council.
Apr. 18.—New South Wales Branch, B.M.A.: Medical Politics Committee and Ethics Committee.
Apr. 19.—Western Australian Branch, B.M.A.: Branch.
Apr. 20.—New South Wales Branch, B.M.A.: Clinical Meeting.
Apr. 26.—Victorian Branch, B.M.A.: Council.
Apr. 27.—New South Wales Branch, B.M.A.: Branch.
Apr. 27.—South Australian Branch, B.M.A.: Branch.
Apr. 28.—Queensland Branch, B.M.A.: Council.

Medical Appointments.

Dr. H. R. Branson and Dr. J. R. Cornish have been appointed Honorary Anæsthetists at the Adelaide Hospital, Adelaide, South Australia.

* * *

Dr. A. J. W. Philpott has been appointed a Certifying Medical Practitioner and a Medical Referee at Melbourne, Victoria, in accordance with the provisions of the *Workers' Compensation Acts* of Victoria.

* * *

Dr. C. H. Hembrow has been appointed a Medical Referee at Melbourne, Victoria, pursuant to the provisions of the *Workers' Compensation Acts* of Victoria.

* * *

Dr. W. W. Stevens has been appointed Visiting Medical Officer to the Eventide Home, Charters Towers, in accordance with the provisions of *The Charitable Institutions Management Act of* 1885, of Queensland.

* * *

Dr. G. V. Hickey has been appointed Government Medical Officer at Toowoomba, Queensland, in pursuance of the provisions of *The Health Act*, 1937, of Queensland.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xviii to xx.

Commonwealth of Australia, Department of Health: Medical Officers.

Department of Public Health, Western Australia: Medical Officer.

Koorda Road Board, Koorda, Western Australia: Medical Officer.

Royal North Shore Hospital of Sydney, New South Wales: Junior Resident Medical Officer.

Sydney Hospital, Sydney, New South Wales: Honorary Officers.

Medical Appointments: Important Notice.

Medical Practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
New South Wales: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
Victorian: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
Queensland: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
South Australian: Secretary, 178, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
Western Australian: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

Editorial Notices.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned. Orginal articles forwarded for publication are understood to be offered to The Medical Journal of Australia alone, unless the contrary be stated.

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